THE ENGINEERING AND MINING JOURNAL.

WITH WHICH IS INCORPORATED

THE COAL AND IRON RECORD.

VOL. XX.—No. 25. NEW YORK, SATURDAY, DECEMBER 18, 1875. PRICE 10 CENTS PER COPY.

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Is devoted to MINING, METALLURGY, GAS MAKING and ENGINEERING.

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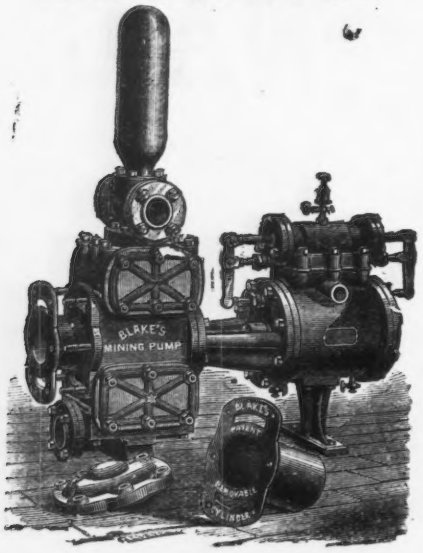

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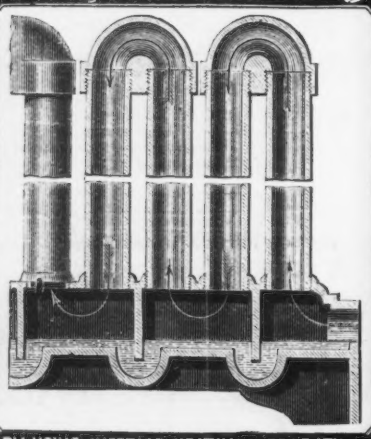

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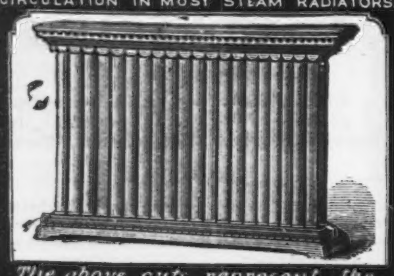

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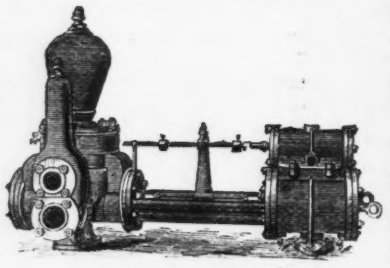

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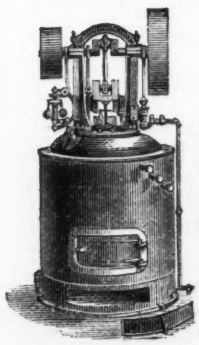

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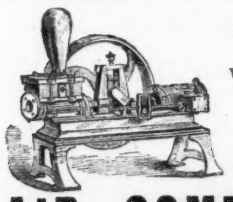

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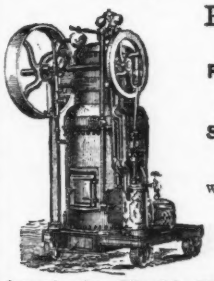

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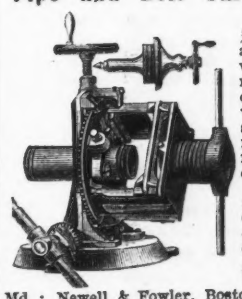

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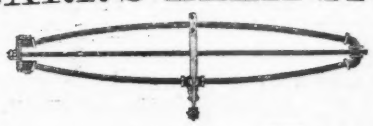

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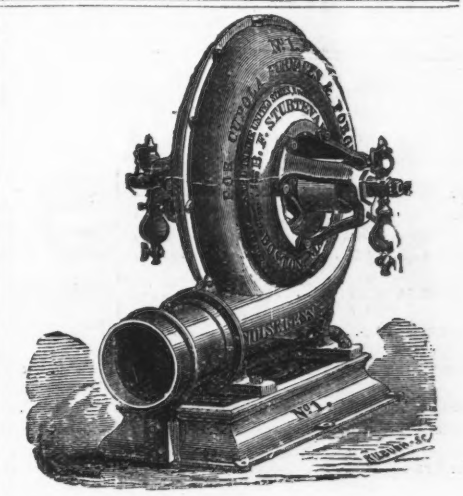

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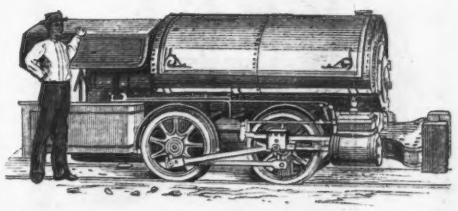

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DEAR SIR : NORTH ADAMS, MASS., Aug. 20, 1874.

Within the last six months we have used some 30,000 lbs. of your "Mica Powder," and with the exception of the "Tri-Nitro-Glycerin" itself have had no better explosive in our works here. It is light to carry, safe (as far as that term can be applied to any explosive) to handle, "nimble" to explode and thorough in combustion—a very essential quality in all preparations of Nitro-Glycerin.

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THE ENGINEERING AND MINING JOURNAL.

RICHARD P. ROTHWELL, C. E., M. E.
ROSSITER W. RAYMOND. Ph. D. } Editors.

NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

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Colliery Explosion in Belgium.

A cable dispatch dated Brussels, December 16, advises us of a fearful explosion of fire damp at the Framières Mine, near Mons. It is reported that one hundred and ten miners lost their lives. Eleven have been taken out injured.

Gas vs. Kerosene.

THE gas companies, though conservative to a degree that may sometimes be called by another name, can learn, though apparently only by costly lessons. Those that watch the signs of the times cannot but see that the public, forced by the hard times into the strictest lines of economy, will not submit, without protest, to so essential an article as gas being kept at prices which seem to be unaffected by reductions in the rates of wages or the cost of coal. "Cheaper and better gas" is the legitimate demand of our citizens, and, though the gas companies, with that self-satisfied complaisancy that comes naturally with enormous dividends and surplus funds (when all other industries are suffering severely), see no need for any change, yet the defection in favor of kerosene, which is already making serious inroads on the profits of the Brooklyn companies, will, probably, awaken them to these demands. The New York companies can afford to supply a better and cheaper illuminating gas, and, sooner or later, they will have to do it.

In Brooklyn the public, evidently, have little faith in the "truth and conscience" element of Gas Company management, and it is averred that the gas bills are not correctly made out. This we believe to be altogether a mistake; the general public does not know how easy it is to increase the volume that goes through the metre by simply making a gas of a low density. The Brooklyn *Eagle* makes the following remarks:

"Several of the gas officials declare that they cannot reduce the price of the present unpopular quality of gas. On the contrary, the most enterprising of the gas officials, Mr. LIBBY, President of the Citizens' Company, favors a reduction of the price if it can be done all round, and other concessions to the public, on the same conditions. That gentleman also avers that his Company made a better gas last year from naphtha, and at a less expense than that which now is made from coal. He admits that the pressure of the other companies, and that pressure in his own, has forced his Company this year back from naphtha to coal, but the reasons for that can be found, by the public, in considerations which have to do with a uniform rather than a progressive policy."

This agitation is likely to result in a better article in Brooklyn, and the example of the Mutual Company of this city in furnishing a gas of fully 18-candle power against, say, 13-candle power gas of other companies, is likely to bring in an improvement on this side of the river also.

The Miners' National Association Colonization Scheme.

THE following extract, from the *Workingman*, answers some of the questions propounded a few weeks ago, in our notice of this, so-called, "co-operative mining" scheme:

"A charter, with valuable privileges, has been obtained from the State of Kentucky. The capital, $500,000; there are 100,000 acres. The 100,000 shares will cost $5 each. It is thought best to sell only the surface right and timber to individuals, retaining the water powers and minerals in the company. The reason for this is that individuals can improve the land and cut the timber, but to develop the mineral will require combined action; then every one will have some interest in the greatest value of the property. This will consolidate their power and make them more homogeneous. In buying shares a person can own IN FEE, as many acres as he has shares, and also have a right to a proportionate, but undivided portion of the water powers and minerals of the whole property. By this means the settler has the advantage in the increased value of the minerals which is caused by the settlement on the land. HAD THIS PLAN BEEN ADOPTED WHEN LABORERS SETTLED IN THE SCHUYLKILL COAL REGION, SOME OF THE GREAT INCREASE IN THE WEALTH OF THE MINES THERE WOULD HAVE GONE TO THEM. Every reasonable inducement will be offered to thrifty, economical, temperate and well-wishing people to settle on these lands. Shares will be sold at one-fifth cash and the other four-fifths in four yearly payments without interest. A deed will be made out, but not delivered until all the money is paid, unless a mortgage is given for the unpaid money. To those who pay cash for all or part of their purchase a discount of twenty per cent. will be made, and in that proportion for those who buy on credit and afterwards pay before the money is due. Ten per cent. of all the money paid will go into the treasury of the company, one-half to be devoted to developing the minerals, and the other for roads and other help for settlers. In case more than one person selects the same site, the highest bidder shall have the preference, and the excess or premium shall go into the treasury to be used as above named. This enterprise is so large and so far-reaching in its results, that it must not be started until there are enough of the right kind of people wishing to go, to insure its success. A good living in a healthy locality can be insured to those who go and are not afraid to work, and to their children wealth and comfort in proportion to the wisdon with which the enterprise is managed. Nature has placed there the elements of untold wealth; good, honest people can conbine these elements and be well rewarded. As soon as enough signify their intention of going and their ability to start the enterprise, I will pay the expense of an examination of the title by any lawyer—Mr. HUGHES would suit me—who might be selected, as well as the expense of two persons to visit and report on the lands."

It is now pretty evident the whole thing is loaded with an enormous commission for some one, for at $5 (less 10 per cent. which goes into the working capital) per acre, the land is placed at, probably, five times its present market value. Within the past year or two we have known of more than one million acres of land in that region, sold at considerably less than one dollar an acre. It was not all coal land, it is true, but there, farming land is valued more highly than that which contains coal, and the property recently put on the English market, as the Southern Coal and Iron Company, though situated much nearer than this to railroad lines now built, and containing both coal and iron, was paid for by the company at 6 shillings, or $1.50 an acre.

We believe the project of colonizing these coal lands, in some such manner as that proposed, would be beneficial for the men who took part in it; but they should not be made to pay three or four prices for their land, and their deeds should not be made in such a way, that if they are unable to continue their payments, they will lose all they had previously put in.

The project has many excellent points, but it is one into which abuse can readily creep, and its management will require close attention and business ability.

Discriminations in Freights.

THE course adopted by the freight lines out of New York, within the past few years, has become so antagonistic to the general commercial interests of the city, and so injurious to many of the leading branches of trade centered here, to the great special advantage of neighboring competing points, that, unless New York merchants take some prompt and definite action to protect themselves and the future welfare of the metropolis, both must suffer seriously.

The Combination rates, west from New York, for the present winter, have been arranged on a basis to many important points, of nearly one hundred per cent. in favor of Boston, and always largely in favor of Baltimore and Philadelphia, mostly over the same roads. For example, take the special class of goods, which includes iron, lead, pig and bar tin, tin plates, copper, etc., and the rate per 100 lb. from New York, Boston and Boltimore to several of the principal Western cities, together with the distances between the ports and those cities, are given in the following table:

Special class freights, per 100 lb.

From	New York.		Boston.		Baltimore.	
	Distance, miles.	Freight. cents.	Distance. miles.	Freight. cents.	Distance. miles.	Freight. cents.
To Chicago	715	35	850	15	612	30
" St. Louis	868	49	1030	23	734	42
" Cincinnati	554	32	718	16	335	24
" Louisville	625	44	792	23	475	35
" Cleveland	400	23	540	14	315	19
" Toledo	494	27	632	14	405	22
" Indianapolis	630	33	792	16	505	27

So far as we can learn, the discrepancy on other classes of goods is even greater. The rates charged to Chicago from New York and Boston is as follows, per 100 lb.:

Class.	1st.	2d.	3d.	4th.
From New York to Chicago,	75c.	70c.	60c.	45c.
" Boston to "	40c.	40c.	30c.	23c.

It would seem as if the railroad companies were trying the old-fashioned plan of killing the goose that lays the golden eggs; and if this policy be persisted in, the result will doubtless be the same as that recorded in the fable. We hear, already, of large importations of goods made through Boston by New York merchants; and, if this discrimination against New York should be continued a few months more, it would not only be a very serious immediate loss to this city, but it would open up other avenues of trade that would permanently absorb no inconsiderable proportion of the business that heretofore has come through this port. Our merchants and city authorities should act at once in the matter, and, if in earnest, they can quickly bring to reason the railroad companies that have constantly many favors to ask of the city.

A Far-fetched Theory.—The following high-flown theory of vein formation, is going the rounds of the western "Scientific" papers.

"All metals were at some time gases, and the study of the vein system includes that of the ore both in its solid and gaseous form. The mind, in its electric thrills, must have a tilt with these gases as they existed before the mineral field was formed. Iron mountains, and lead and copper veins, may owe their origin to other planets which, having lost their cohesive attraction, scattered their elements in a gaseous form to build up other worlds."

It is a little "etherealistic" for "practical science," but it may seem less visionary to the average 'Friscan, who is accustomed to deal in mining stocks, the value of which is as attenuated as the common sense in the above quotation.

Improved Horse-Shoe and Horse-Shoe Machinery.

THE Albany and Rensselaer Iron and Steel Co., of Troy, N. Y., are making both iron and steel horse-shoes, of improved construction, by improved apparatus, under the patents of Mr. J. T. WALKER.

The requirements of a good iron shoe, next to good materials, are: first, width and density of metal at the toe, so that the successive new steel caulks can be attached without destroying the iron; second, thickness at the "quarter" near the last nails at the heel, which is usually the weak point; third, such a construction that the nails shall not tend to work loose; fourth, some means of preventing the shoe from breaking down and rapidly wearing on the thin ridge usually left outside of the nails, and of preventing the splitting of the shoe by repunching; and also, fifth—a requirement of equal advantage to maker and user—a form which can be produced by durable machinery, and, hence, made cheaply.

Mr. WALKER meets all these conditions: first, by rolling a projection, corresponding to a toe-caulk, on the part of the straight bar which is to form the toe of the shoe; this projection, when the bar passes into the horse-shoe machine, is upset or jammed into the toe, thus widening it and greatly increasing its density, and so forming a sort of bed-plate into which, as steel caulks are worn out, new ones may be impressed and welded without destroying the iron.

Second, this projection incidentally performs another important function; it is a register, which stops the long rolled bar, as it is fed into the machine, at exactly the right place—exactly right, because it is in the middle of the shoe, and contraction in cooling is equal on both sides of it. If the stopping apparatus were applied to the end of the bar, the contractions would be unequal.

Third, this projection, at the toe of a *steel shoe, is* the toe caulk, and is not upset. The bending and finishing of the shoe is, otherwise, the same, in the same machine. Thus the toe-caulk of a steel shoe is formed when the bar is rolled, and thus cheaply formed, instead of having to be worked up expensively, out of the bar in the machine.

Fourth, the part of the bar forming the "quarters" of the shoe, is compressed laterally only, so that it has *room* to upset and thicken, while in a machine which rolls the shoe to finish it; the same thickness of quarters cannot so readily be attained.

Fifth, the places for the nail-heads are *countersinks, instead of creases.* This is one of the most important features of the system for several reasons:

I. The head of the rail bears on four sides of the countersunk hole instead of on two sides of a crease. The increased frictional resistance of the head has proved to be very material. But the frictional resistance is not all; the shoe, from the direction in which the horse's foot strikes the pavement, has a tendency to slide fore-and-aft at every step; consequently the fore-and-aft sides of the countersinks are buttresses which keep the nail from moving and the shoe from working in this direction; hence the nail keeps tight both in the head and in the clinch.

II. A countersink is a very small depression in the wearing face of a shoe, while a continuous crease is not only a large, but it is the begining of a continuous split along the whole length of the shoe. So that the countersink not only increases the wearing surface, but it leaves a series of bridges between the body of the shoe and the outer rim, which prevent its breaking down. This construction also prevents the shoe from splitting when it is repunched. And more than this, it protects the nail head from dislocation by hard substances which may work into a crease. The head is, in fact, in a tight cell where nothing can disturb it.

III. The formation of a crease in the horse-shoe machine is a costly operation, while *rolling*-in countersinks, at the time when the horse-shoe bar is made, is comparatively cheap.

The rolling machinery, which produces bars ready to be cut up into partly made shoes, has been improved chiefly in the following manner:—1st. The countersinks are formed by steel pins inserted into the rolls of an ordinary rolling mill. 2nd. The parts of the roll which form the bar, consist of steel rings slipped over the cast-iron body of the roll, so that the parts which most rapidly wear can be readily renewed, and so that different sized bars can be cheaply produced.

The horse-shoe machine simply cuts off the necessary portion of the bar, bends it, drives the toe projection into the body of the toe, and partially flattens it, and upsets the quarters and heel. More than this, it leaves the shoe perfectly flat, and hence easily fitted to the foot. The operation of the flatting part of the machine is more like that of a hammer than like that of rolls, so that the product resembles a forged rather than a rolled shoe.

Steel shoes are readily made by this simple machinery, and it is probable that even without recaulking they will prove cheaper to consumers than iron shoes. They may, however be recaulked if that should prove cheapest. When we consider that there are about 7,500,000 horses in the United States, the subject of horse-shoes becomes one of vast importance. A. L. H.

The Cresent Steel Works of Messrs. Miller, Metcalf & Parkin, of Pittsburgh.

THE above works have grown in ten years, from a very small plant to their present capacity of twenty-four tons per day, of fine steel. The plant consists of six steam hammers, modified by their mechanical engineer into models of simplicity and accuracy in working. There are three trains of rolls of 12 in., 9 in. and 8 in. in diameter, all of the latest model and so solidly put down upon heavy masonry as to be entirely free from vibrations. The 12 in. train has a cast steel roll 12 x 36 in. to do the heaviest work. The 9 in. mill has highly tempered and polished steel strand rolls, to give a fine finish. The 8 in mill is composed entirely of beautifully polished steel rolls, hard as glass, which are used for finishing fine clock spring steel, corset stay, key steel, and other fine varieties of light gauge.

The melting furnaces are all Siemens' gas furnaces, and the heating furnaces are, all but one, run by gas, and that one will soon be changed to a gas burner. Siemens' furnaces are used with an electric alarm to insure regular reversing, and also Swindell's new gas furnace, which is working beautifully, but no data are yet obtained as to its economy. The boilers for the whole concern are arranged in 5 batteries, 2 of 3, and 3 of 2, 42in. x 26ft, two flue boilers, all led into one large stack and are so centrally located as to conveniently supply all of the hammers and engines of the concern.

The specialty of this firm is the manufacture of fine steel, and their reputation is so wide and their success so well assured that it is unnecessary to enlarge upon this point. They stand at the head of our fine steel makers, and their products are rapidly driving the English steels from this market.

A visit to their compact, well organized and busy place will repay any one who is interested in the manufacture or use of steel.

Gas-Cooking Apparatus and its Economy.

THE use of coal-gas was long confined to lighting purposes, and its application to heating rooms has not yet become general, owing in great measure to the unsavory and unhealthy nature of the fumes given off by the most perfect stoves. For the same reason, doubtless, the introduction of gas-cooking apparatus has been made even more difficult. The convenience of cooking by gas, however, especially during the summer months, would have been with many persons a great inducement to its use could they have been assured that the apparatus, offered for that purpose, would give the required heat without communicating an offensive flavor to the cooked food, seeing that such a method would necessarily have been not only cleanlier but more manageable and economical than that by an ordinary fire.

A number of contrivances for cooking by gas were shown at the South Kensington Exhibition, in 1873, and at the exhibition in Manchester in the present year. Among these the apparatus exhibited by Messrs. LEONI & Co., London, appears to have received the highest commendation.

Economy of fuel is a marked characteristic of all the applications by this firm of gas to cooking. One of the elements of this economy consists in the adoption of the principle of BUNSEN's burner. The feed gas-pipe also is encircled by an air-chamber, the contents of which are drawn from without through apertures in its back third, whilst openings in the central tube, at a situation corresponding to the front third of the air-chamber, admit air into the interior of the pipe in sufficient quantity to insure its thorough combustion. The lining of the baking and cooking ovens with a fire-clay composition, effects an additional saving in fuel, checking radiation from the surface, which is also an advantage in other respects. The apparatus consists of two cylinders, one of which surrounds the other, with a sufficient air-space between the two, partly occupied by materials which are bad conductors of heat. This arrangement diminishes outside radiation, and, at the same time, leaves a free channel for the products of combustion, fumes, etc., to escape, and prevents their entering the inner chamber. On passing out of the middle chamber they enter the flue and are carried off. An important feature in the invention consists in an arrangement for broiling and grilling by reflection. In the kitcheners, the inner chamber, which is constructed on the same plan as the roaster and baker, has, in addition, a series of gas jets in its upper part, from which the heat is reflected downwards from the fire-clay roof, so that any viand may be cooked, whilst the fire-clay top can be utilized as a hot plate. A family kitchener of this description will cook a sumptuous dinner for twelve persons in an hour and a half with a consumption of gas of only 48 feet. The economy of the process may be judged of, from the testimony of the Secretary of the London Hospital, where it has been for nearly three years in practical and constant working. Within six months of its adoption, the waste of meat in cooking was reduced from 33½ to an average of 14½ per cent., while the daily average consumption of gas fell from 610 to 250 cubic feet. At present the result is a yearly saving of over £500 to the hospital, 300 lb. of meat being cooked daily in two hours with the attention of a single man for sixteen minutes, and the combustion of about fifteen pennyworth of gas. Briefly, as compared with other similar apparatus, Messrs. LEONI & Co.'s may be qualified as more healthful, more certain, less troublesome and less wasteful and expensive.

The principle of the apparatus is sufficiently described in the brief account that has been given of the roaster and kitchener, but it is the subject of many ingenious modifications, to suit the varied circumstances of which such apparatus is required. We have thus portable stoves, by means of which a dinner for eight persons may be cooked together or separately at a cost of three-halfpence, and larger ones up to the largest capacity required for boarding-houses and hotels. The numerous testimonials received by the patentees, all speak expressly to the economy of the stoves and to their freedom from offensive or unwholesome effluvia. One writer says there is absolutely no taste whatever from the gas, notwithstanding the absence of a flue, and that the cooked viands are altogether superior in appearance and flavor to those dressed by the usual process before an open fire. Another application is the heating of water for a bath or for the conservatory, and a series of elegant stoves have been constructed for warming by gas offices, schools, halls, etc., a species of which is made to deflect the light and heat to a polished brass or copper surface below, furnishing a very good imitation indeed of an open sea-coal fire.—*Iron.*

Coal-Cutting Machinery.

MR. EAGLESHAM, of Kilmarnock, and Mr. RIGG, his managing partner at Polton Colliery, near Edinburgh, have patented an improved coal-cutting machine, which is at present at work in one of the Polton pits and has proved very successful. The machine consists of a frame, which is carried up between two end frames by means of studs or journals keyed to blocks which move up or down in slides formed in the center of each of the end frames; thus, the whole machine, while held firmly between the end frames, can be raised, depressed, or canted to any angle required. The means employed for this purpose are two powerful screws, passed through the blocks fitted in the slides, and acting as a nut. Other two screws are employed in almost the same manner to cant or angle the machine to suit the dip or rise of the seam the machine is cutting. The end frames are mounted on wheels, which run on rails. On the frame are placed two cylinders 6-in. in diameter and 10-in. stroke, which drive a spur-wheel, which again gives motion to a revolving wheel or disk, and on both sides of this disk, at regular intervals, are placed loose or revolving cutters of about 5-in. in diameter, pointed as pick point. Thus, when the disk revolves the cutting wheels, being loose on keys fastened to the disk, are revolving at ten times the speed of the disk. The machine propels itself by a chain, which is fast at one end, and works upon a small barrel.—*London Mining Journal.*

M. Chaudron's Method of Sinking Shafts.

A FEW days ago we stated that the directors of the Cannock and Huntington Colliery Company had decided to adopt the Chaudron process for the sinking of the pits at Huntington. This resolution was arrived at after great consideration, five of the directors, accompanied by two mining engineers, having visited Belgium and the North of France for the purpose of inspecting the pits sunk and sinking under the patent. The party consisted of Mr. F. F. Clarke (the Chairman), Messrs. AVINS, BUTLER, BAYLISS, DUIGNAN, SAMUEL BAILEY and J. W. BAKER. We are enabled to supply the following interesting particulars of the visit:—

The party first visited Brouay, where a pit had been sunk, and was then being lined with tubbing. From thence they went to Marles, where one pit had been completed and another was in course of sinking; and from thence to Mons, where two pits were being sunk. At all these places the whole of the party were impressed with the extreme simplicity of the work, and the very perfect character of the arrangements. The pits at Mons were very wet, the water lying within a yard of the surface. Under M. CHAUDRON'S process no

water is drawn during the sinking, and if the sides do not stand light lining tubes are put in. Very few hands are required in the work, eight or ten men being sufficient for all purposes, and the machinery is calculated to go through any ground, from running sand to the hardest rocks. All the sinkings visited were through chalk measures, and occasionally through seams of solid flint, but the powerful machinery breaks through everything, and the spoon, which is estimated to hold from 5 to 6 tons, is let down, filled by a self-acting apparatus, drawn up, and emptied with as little trouble as an ordinary bucket: 28 pits have been sunk under this system at depths varying from 300 to 450 yards, including some requiring 250 yards of tubbing, and the system has not failed in a single instance. The tubbing is not in segments, as in England, but is cast in solid pieces of any diameter required, and 5 ft. high, with flanges. Sheets of lead are passed between each casting, and is then securely riveted to its neighbor.

After going down all the pits which were sufficiently free of water, and carefully inspecting the tubbing, which was fixed, or in course of fixing, the directors visited the foundry at Chateau Lineau, where the tubbing is made, and where they saw it cast and tested with a strain of 420 lb. to the square inch. The result of the visit was to satisfy the whole of the party that the sinking by the Chaudron process is more certain, speedy, and economical than any plan now adopted in this country, and that the tubbing used by M. CHAUDRON is vastly superior, safer, and cheaper than that used here.—*Birmingham Daily Post.*

Keystone Portable Forge Company.

IT is a pleasure, in these times of business depression, to note the success of our manufacturers, in introducing their products in foreign markets, and at the same time reporting their business at home "fair" or "good". If we analyze the cause of this prosperity, we can generally find it to be very easily traceable to intelligence, skill, and energy, in the management of the concern, and to the consequent real excellence of the article manufactured.

The Keystone Portable Forge Company's blowers and forges are among those articles of American manufacture, which are now attracting much attention in foreign markets, and particularly in England; indeed, we are informed that the orders from England alone are now nearly equal to the entire home demand, and the extent of this is evident from the fact that though the manufacture commenced only in 1871, we now find these forges in use in nearly every part of the country.

Keystone Blowers. These are centrifugal fans, which can be used either as pressure or exhaust blowers, the former for forges, foundries, rolling mills, etc., and the latter for ventilating mines, buildings, ships, etc., and removing shavings and sawdust, and as gas exhausters.

There are many points of superiority claimed for these blowers; among them we may note;

Each blade or wing has at its base a spur or cut-off, and on each side a flange connecting with the spur. These blades and spurs are firmly secured and braced to a series of spiders, through the exact centre of which runs the shaft. The blades and spurs are made of steel, the spiders of steel or brass, and the shaft of the best tool steel. Each separate part is finished with great care, and the completed blast wheel is perfectly balanced before leaving the shop.

Improved Anti-friction Bearings are used which, require no oil or other lubricant, last for years without attention or repair, and are readily duplicated at small cost, if, from unfair use or any other cause, they should become unserviceable.

These bearings are bushings either of iron or brass, lined with an anti-friction compound or perfectly dry lubricant, causing the journals to run cold, without perceptible friction, wear or noise. This dry lubrication is much nearer perfection than can be produced by oil or any other lubricant, while the expense, attention, dirt, noise and wear of oiled bearings is entirely avoided.

Each bushing is fastened by a set-screw, the point of which rests in a spiral groove on the upper face of the bushing. If ever necessary to adjust the shaft (which is not likely to occur), loosen the set-screw, and turn the bushing slightly to the right or left, as required.

The greater proportional width of the blast wheel at the point where the blades and spurs join makes the volume of these blowers much larger than of others having blast wheels of equal diameter but less width.

The Pressure of Blast, is claimed to be greater than that produced by other centrifugal blowers running with equal power. The greatest care and highest mechanical skill is employed in making and finishing these blowers. The pulleys, after being keyed to the shaft, are faced true to a line. The larger sizes have a pulley on each side. All parts of the blowers are made of the best material. Each blower is tested before leaving the shop, and guaranteed when sold. In beauty of form and finish, durability and smoothness of running, these blowers are claimed to be unequalled. Notwithstanding their marked superiority the list-price of these blowers, both pressure and exhaust, is considerably less than that of any others of high standing.

Fig. 1.

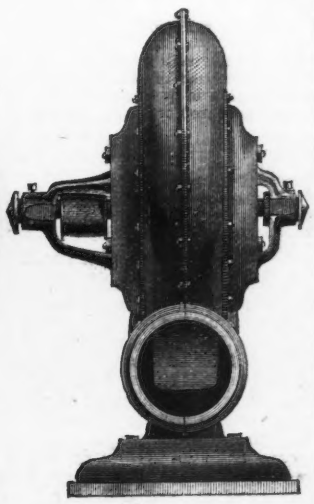


Fig. 2.

Figures 1, and 2, show the latest form of pressure blowers suitable for furnaces, cupolas, etc. They are made of sizes, from 14 inches to 60 inches diameter, and cost from $30 upwards.

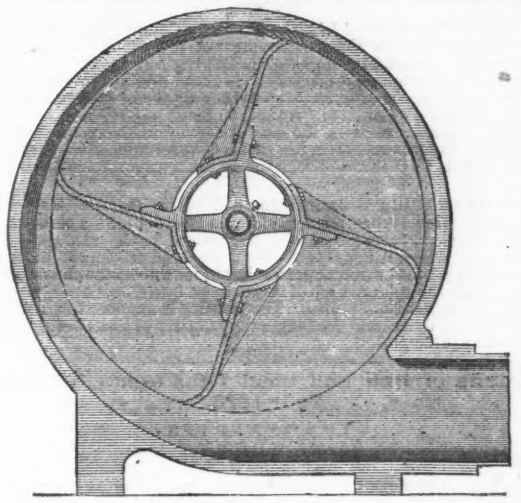


Fig. 3.

Figure 3, represents the Keystone fan blower, adapted to forges and other purposes not requiring so heavy a blast as the pressure blower. They are of sizes from 6 inches to 16 inches diameter, and cost from $8 to $30.

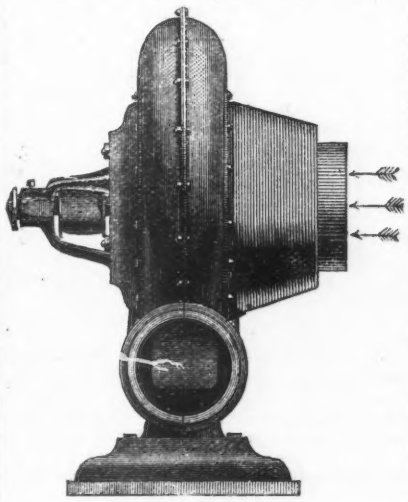


Fig. 4.

Figure 4, is an exhausting machine, suitable for gas works, for mines, exhausting dust, shavings, etc. These will be found very convenient for use in the mines in driving drifts or tunnels, and for small mines. Their great efficiency and low cost commend them to those requiring fans.

Keystone Portable Forges are exceedingly convenient substitutes for the old fashioned forges, worked with the usual bellows of the type described by AGRICOLA, more than 300 years ago.

The Keystone Portable Forges are light, strong, durable, cheap, easily worked, and occupy but little space.

Their Fan Blast is most effective, and is far superior to bellows in every respect.

All the parts are of iron or steel, are fastened by bolts and nuts, and are interchangeable.

The legs are of tubular iron, combining strength with lightness in the highest degree.

These forges are made of all sizes adapted to heating iron from the size of wire, to bars 8 inches in diameter, they are much cheaper and more satisfactory in working, than the ordinary style of forge. Nothing, for example, could be more convenient for a mining camp, than the Keystone miner's forge, that weighs less than 100 lb., measures 15x22 inches, and costs about $50—including blower—other sizes of forges cost from $25 upwards.

For full particulars with regard, both to forges and blowers, we refer those interested to the advertisement of the Keystone Forge Company, on another page and to the Company itself, 120 Exchange Place, Philadelphia.

Newfoundland Minerals.—The great success of the copper mines of Newfoundland, which at one time were thought worthless, has again aroused the attention of many to the probable importance of the deposits of copper and other minerals. It has been known for years that deposits of copper exist in some parts of Charlotte County. Mr. JOHN WOODWARD, who has devoted much time to the search, has discovered in Le Tete, not far from St. George and St. Andrews, no less than ten lodes of copper of from eight to ten feet each in breadth, and several large specimens of the ore which he exhibits are of unusual richness. The amount required for working these lodes sufficiently to test their fertility would not, it is thought, be very large. A copper mine worked in the neighborhood has yielded large quantities of rich ore, and Mr. WOODWARD's lodes give indications of being even richer. A geologist, employed in examining the district more carefully, has also discovered what he believes to be a very valuable deposit of lead and silver, and he writes under date of Oct. 19th, 1875: "The specimens of lead and silver I send you are the production of my prospecting on your island in this place. The island is connected with the main land by a bar that uncovers about two hours, ebb. It contains about thirty acres, and is of the argilaceous formation, with some belts of coarser slate and imbedded traps. There are several lodes running through the island with the strike of the slate, about north 60 east. These veins show very strong surface indications, and are composed of seams of gossan and quartz containing a very superior quality of lead, silver and other sulphurets; and, I have no doubt, if opened up, would prove of great value. The silver and lead are the same as Newburyport deposit."—*Canadian paper.*

The Mineral Wealth of Manchuria.—The British Consul, at Newchwang, Mr. ATKINS, refers, in his recent report, to the gold region southeast of Kérin, and some 500 miles northeast of Newchwang. The region appears to be difficult of access, and strictly guarded by its inhabitants, who live there under a species of rude feudality. Fabulous stories are told of the richness of the gold washings. The place has sprung into notice, or existence, within the last three or four years. The Consul says that the colonization of these provinces, and of Eastern Mongolia, is proceeding with great rapidity. The forests are fast disappearing, and large tracts of country are being added to the productive area of this part of the empire. The Government sanctions the colonization of Mongolia by the Mongolian princes, but the settlers in the Yalu Valley, another disorderly district on the Corean frontier, are there in defiance of the law. They are gold miners, ginseng diggers and lumberers. The Consul observes that a railway from Newchwang to Monkden would pass through a cultivated and populous plain, touching three large cities on the way, and a branch twenty miles long would tap the iron and coal district. The mines, rudely worked and accessible only by hill-roads and rude native carts, now send their produce 100 miles to Newchwang, in the south, and to cities at like distance in the north.

Notes.

Measurement of Velocity of Light.—Professor CORNU of the Ecole Polytechnique Paris, uses an instrument for the measurement of the velocity of light between stations of observation, depending on an electrical registering apparatus, the results with which are said to be more satisfactory than those obtained by FOUCAULT's method. FOUCAUT determined by his experiments whether light was diffused more rapidly in water than in air, and estimated its velocity in air at 185,157 miles a second. Professor CORNU's estimate, based on the data of his new instrument, is 186,660 miles a second. FIZEAU's experiments with his toothed-wheel apparatus gave a velocity of 194,212 miles, and in English text-books the round figure 196,000 miles is commonly given.

Magnet of Iron Fillings.—JAMIN has read before the Academy of Sciences a paper on the production of magnets from fillings of soft iron. These are collected in copper tubes, subjected to pressure, and magnetised in the usual way, a magnetic force being induced which is equal to that of a steel rod of similar dimensions. The case is thus presented that a metal possessing in its whole state no magnetic power, may by division and the compression of its particles into a new body, take on as great an inclination for magnetism as steel. The polarity is supposed to depend upon the separation of the particles, and the magnetic property of steel is supposed to be referable to the same principle.

Investigations of Iron and Steel Rails made in Europe in the Year 1873.*

BY T. EGLESTON.

CONTINUED FROM PAGE 572.

THE following table gives the service already rendered by the rails remaining upon the road. The increase is much less regular than in the previous table, although it is very noticeable, that after 13 years it diminished, though not so regularly as in the former case.

Service of the Rails remaining on the State Railways of Belgium, in 1869.

No. of years of service.	Length of rails in meters.	No. of years of service.	Length of rails in metres.
½	297,224	16	56,270
1	288,834	17	65,764
2	621,404	18	8,932
3	491,198	19	3,234
4	233,933	20	37,991
5	176,004	21	8,134
6	196,380	22	213
7	232,924	23	29,266
8	196,908	24	1,000
9	157,539	25	320
10	143,842	26	815
11	120,027	27	8,262
12	204,048	28	1,121
13	465,107	29	"
14	219,365	30	1,744
15	98.795	31	10,009
	Total		4 378,607

The following table gives the mean life of the rails taken up from the road, and shows the very remarkable result, that the old-fashioned **T** rail and the double headed rails, with unequal heads, have a life of 13 years. This applies, however, to rails manufactured when quality was more sought for than quantity, and we see immediately in the modern rails a diminution in life of from ½ to ⅔. The same superiority in the American rail being remarked that has been noticed elsewhere:

	Years.	
T rails with a curved stem	13	Mean life—the length of each particular kind of rail being taken into consideration, 13¾.
T rails with a straight stem	13¾	
Double-headed rails with dissimular heads	13 4-5	
Double headed rails with symmetrical heads	4¼	
Ordinary American rails	6 9-11	

The following table gives the life of the rails remaining upon the road in the year 1869, and gives the same extraordinary results for the **T** rails, and shows the great economy of making a first-rate article. For the first-class these rails have attained the extraordinary life of 23¼ years.

Life of the rails remaining on the State railways of Belgium, in 1869.

	Yrs.	
T rails with a curved stem	23¼	Mean life—the length of each particular kind of rail being taken into consideration 7 1-10.
T rails with a straight stem	20 9-10	
Double-headed rails with dissimilar heads	7¼	
Double-headed rails with symmetrical heads	4 5-7	
Ordinary American rail	3 7-9	

Steel rails have, of late years, been very generally adopted by the leading companies of this country and Europe. The fears expressed with regard to their not being able to resist the influence of this climate, have proved to have been entirely groundless. The Central RR. of Belgium commenced to use them in 1868, in the part of their road where *no* iron rails stood the test, with the most satisfactory results. It was at first feared that the steel rails would become rapidly polished, and that the locomotive would, consequently, have less adherence, and that the brakes would necessarily act less perfectly; but all these fears were proved to be without foundation, though steel rails do certainly become polished much more rapidly than iron.

The Northern Railway of France adopted, in 1873, a steel rail of the American pattern, which weighed 30kg. per m., made at Terre Noire and at Creusot. The normal length of this rail is 8m., but in order to facilitate the manufacture lengths of 5, 6 and 7m., are also admitted. The strength of this rail, incomparison with the types of all the rails in use on the principal roads of Europe, is shown in the table below. The limit of force, exercised on the fibers of the top of the head of the steel rail, of 30k, and the iron one of 37k., when new, are represented for the steel rails by $\frac{V}{I}=7.742$ and for the iron by $\frac{V'}{I'}=7.012$. The ratio of these two values is $\frac{7.742}{7.012}=1.104$. For the base of the foot, the forces are 7,981 for steel and 6,472 for iron, whose ratio is $\frac{7.981}{6.472}=1.233$.

If these same forces are calculated for the steel rail nearly worn out, and the new iron rail, the ratios are found to be $\frac{9,689}{7,012}=1,882$ for the head, and $\frac{9,100}{6,472}=1,406$ for the foot. For the new rail the greatest increase of force is less than 0.25 of the primitive values, and for the steel rail worn as far as it can be used, the greatest increase of the interior efforts, with regard to those of a new iron rail, is less than the 0.041th part of the primitive values. The limits of elasticity of steel are, however, double that of iron, so that the steel rail which is worn out, or has arrived at the limit of greatest wear, is still stronger than a new iron rail. These figures apply to the charge supposed to be at rest on the rails. If the charge is supposed in motion it is found that the forces are increased only 0.264 for new steel rails, while for iron rails they are increased 0.301, and that when the steel rail has arrived at its maximum use it is only 0.34; so that, notwithstanding its light weight, the steel is better than the iron rail. For the resistance to friction it is found that if T represents the force tending to cut it, s=743T for the steel rail of 30k. and s=662T for the iron. This increase is, however, fully compensated by the increased resistance of the steel, as the increased strain does not exceed, in effective force, more than 5 k. per square millimetre.

Investigations, made by the Northern RR. of France, with regard to the life of steel rails show that the period, though very variable, unlike iron rails, depends directly upon the amount of weight carried over them. It has been ascertained that the steel rails wear out slowly in parallel layers, while iron rails deteriorate very rapidly, and are worn out before they have lost any very great amount of their weight by wear. In order to ascertain exactly what the wear is, a cast in plaster, of the rail before it is laid down is taken, and after a certain number of million tons have passed over it, it is taken up and another cast is taken. The difference is then measured and gives the wear of the rail, per million tons, in millimetres. It has been found, after some years of experiment, that the *very best* iron rails do not last on this line for a circulation of over 20,000,000 tons, while *ordinary* iron rails will not last for over 14,000,000. All the experiments, however, show that steel rails wear uniformly a millimetre for a circulation of 20,000,000 tons, and as the rails now in use are calculated for a wear of 10 millimetres, we can suppose, accidents being left out of consideration, that the steel rail will not wear out before 200,000,000 tons have passed over it, that is to say, that the ordinary steel rail is ten times better than the best iron rail.

The temperature at which the steel rails are finished, has, of course, a great deal to do with its strength, and consequently with its life, and too little attention has been given to this subject. A great many experiments made with the object of comparing the two rails have shown, that in all the experiments on pressure, iron rails preserve a very appreciable permanent set, as soon as the compression attains 17 or 18 kg. per square m.m. while in steel rails this deformation does not commence until about 38kg. In the experiments upon direct traction, iron rails of good quality have a resistance of between 28 and 36kg. per square m.m. Steel have a resistance between 65 and 70.

In the experiments upon shock, iron rails do not resist a force greater than 400 killogrammetres, while for steel rails this resistance is about 900 k. m. Another great advantage of steel over iron rails is, that as they are made of a homogenious material, when they are worn out, they are worth the full value of the steel contained, as steel to be remelted, while the iron of old rails not being homogenious, but being composed of materials which are essentially different, more especially when the head has been made of iron containing phosphorous, is worth but little. The conditions of the contracts however, are generally such as to preclude the use of old iron rails, in any quantity, in the packages for the new ones. The substitution of steel rails for iron, has corresponded at once to a very considerable economy in the care of the road, at the same time that it gives greater resistance and security. For all these reasons the Noithern Railway of France has adopted the steel rail of 30k.*

These rails are not only stronger and better, but are actually cheaper, metre for metre, than the old iron ones of 37k. were, as is shown by the table below.

COMPARISON of the cost price of a kilometre of road laid with iron rails of 37 kg., and of steel rails of 30 kg.

	Iron rails of 37 kg.			Steel rails of 30 kg.			Remarks
	Quantities.	Price.	Cost.	Quantities.	Price.	Cost.	
	Tons.	Frcs.	Frcs.	Tons.	Frcs.	Frcs.	
Rails	74	350	25,900	60	420	25,200	Dec. 1872
Fish plates	3.20	350	1,120	2.325	350	813.75	
Bolts	0.562	530	297.86	0.420	530	220.60	
Screws	1.685	650	1,095.25	1.580	650	1,027	
Wedges for rail ends	0.032	578	18.50	0.024	578	13.87	
Ties	1.167	5	5,835	1.125	5	5,625	
Care of the road, transportation, cost of storage, which is 35 francs the ton of iron or for	79.479	35	2,781.76	64,349	350	2,252.21	
Cost of a kilometre of single track	....	..	37,048.37	...	...	35.154.43	
Excess of the cost of iron over the steel, per km.	....	..	....	...	...	1,893.94	
Or per metre in round numbers	....	...	....	...	...	1.90	

It is more than probable that the same results will hold good elsewhere. In this country, such a result would diminish the expenses for repair of the road, by increasing the life of the rails, so as in some cases to make it possible to run roads, now working either without profit, or at a loss, and it is very desirable that statistics should be collected on this subject. In changing the weight of the steel rail on the Northern RR. it was necessary to take into account, that there were a large number of old iron rails still in use upon the road, and it was therefore desirable to make the steel rail of 30k. of the same height as the old iron rail which weighed 37k. Taking this as a starting point, it was necessary to make the head of the rail as large as possible, and to reduce its body and the width of the foot as much as would be safe, in order to have the greates amount of material in the head, as upon the depth of this part of the rail other things being equal, its life depends, since steel rails wear out proportion

*A paper read at the St. Louis meeting of the American Institute of Mining Engineers, May, 1874.

*This rail is made heavier than the steel rail usually adopted in the United States, which is 27k. In Turkey for the main lines they use a steel rail of 25k.

ately to the amount of traffic. That this has been done wisely, is shown by the wear of the rail on the road, and by the following table prepared by the Northern RR. for the purpose of instituting a comparison between the rails of this road and those in use upon all the principal roads of Europe. It shows a number of very interesting comparative results.

COMPARISON OF THE SIZE AND STRENGTH OF THE DIFFERENT RAILS USED ON THE PRINCIPAL ROADS IN EUROPE.

Name of Rail.	Width of the head.	Width of the stem.	Width of the foot.	Total height of rail.	Section.	Weight, iron 7,600 steel 7,825	I.	Distance from the top to the mean line.	Distance from the foot to the mean line.	V/I top.	V/I foot.	I/V top.	Relation between height and base.	Remarks.
					ms.	kg.		m.	m.					
Northern RR., iron rail of 37 kg.	62	17	105	125	0.004895	37.202	0.00000927	0.065	0.060	7,012	6,472	0.000142	125/105=1.190	
Northern RR., steel rail of 35.360 k.	59	14	102	125	0.004525	35.408	0.00000878	0.0652	0.0598	7,427	6,810	0.000346	125/102=1.225	
Northern RR., steel rail of 30.300 k.	56	12	97	125	0.003871	30.292	0.00000795	0.0615	0.0635	7,742	7,981	0.000129	125/97=1.288	
Northern RR., iron rail of 30 k.	58	14.8	95	113	0.003990	30.324	0.00000646	0.0578	0.0552	9,249	8,832	0.000108	113/95=1.190	
Lyons RR., pattern P. M. steel.	60	16	130	130	0.005.11	40.	0.00001137	0.0702	0.0598	6,172	5,260	0.000162	130/130=1.000	
Lyons RR., iron rail, pattern P. L. M.	60	16	100	130	0.00475	36.123	0.00001019	0.06604	0 06396	6,464	6,270	0.000154	130/100=1.300	
Eastern RR., iron rail.	60	15	99	120	0.004596	34.540	0.00000823	0.06205	0.05799	7,539	7,035	0.000132	120/99=1.212	
Cologne, Minden Co., iron rail.	58.5	14	91.4	124	0.004322	32.347	0.00000850	0.0635	0.0605	7,472	7,118	0.000133	124/91.4=1.356	
Southern RR. of Austria, with heavy grade.	57	13	104	122	0.00396	steel, 31.050	0.00000840	0.0644	0.0576	7,666	6,852	0.000130	122/104=1.173	
Railroad to Vienna. (Experiment.)	53	16	99	79	0.00307	steel, 24.022	0.00000294	0.0451	0.0339	15,340	11,530	0.000065	79/99=0.798	Test made upon a very small number of rails.
Northern RR. of Austria, steel rail.	57	13	110	120	0.003928	steel, 30,736	0.00000763	0.0636	0.0564	8,335	7,392	0.000120	120/110=1.091	This rail has been used since 1866 on Northern road of Austria.
State Austrian RR., steel or iron rail.	62	17	105	125									125/105=1.190	This rail differs very little from the Northern type of 37 kilog.

The steel rail of 30 k. adopted by the N. RR. is supported at 9 points. Near its joints the supports are 60 cm. apart, next to these 90cm., and at all othe places one metre. They are all fished, the holes for which are 0,024 in diameter, and are bored. They are placed directly upon the ties, in places which are cut out for them, and are fixed by two spikes of galvanized iron for the intermediate ties, and with four for the joints. In order that the spikes shall not split the ties at the ends of the rails, they are not placed opposite to one another. Particular instructions are given, that every care shall be taken that the spikes shall not be placed in any pre-existing crack in the tie, nor in such a way, that they will interfere with spikes placed against the end of the rail. These spikes or wedges, are placed at one end of the rail, only to prevent it from slipping, leaving the other extremity free for movements of dilatation to avoid the tendency of the rail, in all soft wood, to shove the outside spike, a cast iron ring 2,50 cm. in thickness, with several projections on its outside diameter, is let into the tie, and the spike is driven through it, care being taken that there shall be at least 4 mm. between the upper part of the ring, and the lower part of the rail. They are now trying the experiment, of not placing the ends of the rails upon the same ties, but either on the next, or on a tie at some distance, so that the joint on one side of the tract, will be either opposite a point near the end, or the middle of the rails on the other. The result is, that as the shocks due to the passage over the joints, are not simultaneous, their action upon the movement of the car, is much less perceptible, and the road is much smoother. This method has not been long under trial, but there seems to be a considerable decrease in wear and tear. A large series of both iron and steel rail ends, cut off near the point of fracture, collected from all the different roads, under varying circumstances, were prepared for etching, in order to study how far the fracture might have been caused by bad welding, or other defects, which entirely escape all ordinary inspection, and to ascertain whether, in the case of steel rails, there was any concentration of material, as has been suggested, near the point of fracture, which would tend to make the rail brittle at that point. Very little attention is paid to this subject of etching, in tests for iron and steel, much less than it deserves. It was hoped that important discoveries, with regard to the causes of fracture of the rails would be made, that many of the points which are now not understood, would be partially if not wholly explained, by the developements, either of concentrations of impurities, or physical defects, which cannot be made visible in any other way. The chemical constitution also of the rail, is a subject which demands the most serious attention, more especially as it is now known that the relative proportions, more than the amount, of certain substances, influence the strength of both iron and steel. Unfortunately the panic of 1873 prevented, not only the analyses of the large collections of pieces of broken rails made for the purpose, but also all the other chemical and physical experiments which had been planned, and for some of which instruments had been devised.

Investigation seems to show that the fracture of almost all the broken steel rails started in defects which escaped the observation, but which were in the rail when it was laid. These defects, if not in the rail when delivered to the company, are generally caused, to a very great extent, by the rail being thrown from the car to the ground; or by other rough handling. The cases, where sound rails are broken by the trains, are comparatively rare. It is very noticeable, that the percentage of steel rails broken soon after they are laid, is exceedingly small, and that, up to a certain time after they have been down, it seems to increase, and then gradually to be reduced to almost nothing. This is owing to the fact, that the fissures or cracks which escape observation, require sometime to be developed sufficiently to cause rupture, and that, this time having been reached, a large number of rails break, and then, after these causes cease to operate, the defective rails being for the most part removed, the normal wear is shown in the sound rails that remain. In rails broken within six months after they were laid, it is, generally, easy to see that the fracture commenced in a small flaw and propagated itself, from the fact that the crack is, more or less, rusted where the break commenced. This cannot, however, be verified in all cases, because the rail is often allowed to lie for some days beside the track, instead of being always taken up and sent immediately to the workshops, although instructions are generally given, that whenever a rail is found broken, it shall be transported at once to the nearest station, to be sent to the workshops of the headquarters of the road, to be tested.

The holes for the fish bolts, in rails of any kind, but particularly steel rails, should never be punched, as minute fissures are likely to be developed in the circumference of the holes; nor should they, for the same reason, be notched in the flange. It is found that a very large percentage of punched and notched rails break shortly after they have been laid. Hence all the roads stipulate that all steel rails, which are to be fished, should be bored, and that, on no account should any change in the condition of the rail be made, after it has once passed through the rolls, except, directly at the ends. It has been ascertained, by careful examination of the facts, that careless handling of the rails is one of the most frequent ways in which the small fissures, which eventually cause their fracture, are produced, and is, consequently, one of the most fruitful causes of railway accidents. It is positively forbidden, by most of the French railways, and manufacturers, ever to throw a rail down, or allow it to drop from any height. To discharge it from the car, at least, two rails are required to be placed as skids, upon which the rails are to slide to the ground. They are then to be lifted to the place to which they are to go. When rails are being piled up, at the works, these skids are a great convenience to the workmen, and they are always used; but, in discharging them from cars, they are not, as it is often inconvenient to place them, and whenever the men think that they are not watched, they will discharge the rails by throwing them, but when this is discovered, it is always punished.

It is generally in the winter that the largest number of rails are broken, and there has been a great deal of speculation, but very few experiments with regard to the effect of cold upon the wear of iron and steel rails. I had devised a method of making such tests, and was to have made a very large series of experiments upon this subject, but, unfortunately, was prevented, I am inclined to think however, from a preliminary examination of the subject, that the cause of fracture is not so much owing to the cold; though both iron and steel have a diminished power of resistance, when subjected to great cold; as to the fact that the road bed is entirely frozen and ridged during many months at a time. The want of elasticity in the road bed, would tend to increase any flaws that might have been started, and the shock of the passing trains would have a much greater effect upon the rail during the winter than during the summer months, when part of the shock is diminished by the elasticity of the road bed. The road bed is also less capable of inspection in the winter, owing to the accumulation of ice and snow and a crack, or flaw commenced, is less likely to be seen, or a broken rail is more likely to be kept in its place, for a certain time, than in summer and is therefore, less likely to be removed before an accident occurs. I am sustained in this opinion by some of the best engineers in Europe. It is greatly to be wished that some such tests as I had proposed to make, should be carried out by some of our roads, in order that this point may be definitely settled, and that we may know exactly how far the strength of the rail is diminished by the cold of the winter. When this is known it is probable some remedy will be found for the greater number of accidents caused by broken rails in the winter months.

In closing this paper, I must express my warmest thanks to the Orleans and Lyons Railway Co., of France, whose engineers entered heartily into my plans of collecting statistics and specific information relating to the broken rails which were sent to me for further investigation. To the engineers of the Northern RR., of France who not only furnished me with a large amount of information, but allowed me to frequently use their shops without charge. I can only express to them and to the Institute my very great regret, that the panic of 1873 which has so serously affected the whole of this country, prevented the investigation from being more than fairly commenced in Europe, and did not allow of anything being done in this country.

The World's Product of Silver.*

By R. W. RAYMOND.

RECENT literary labors have led me to the compilation of the following tables and estimates, which may possess interest for my colleagues in the Institute, and which are here submitted without comment.

VARIOUS ESTIMATES OF THE WORLD'S PRODUCT OF SILVER.

COUNTRIES.	Estimate of J. ARTHUR PHILLIPS for 1800.	Estimate of BIRKMYRE for 1846.	Estimate of J. ARTHUR PHILLIPS for 1850.	Estimate of BIRKMYRE for 1850.	Estimate of J. D. WHITNEY for 1854.	Estimate of J. ARTHUR PHILLIPS for 1865.	Estimate of W. P. BLAKE for 1867.
	Weight, lbs. troy.	Value £sterling.	Weight, lbs. troy.	Value £sterling.	Value U. S. coin.	Weight, lbs. troy.	Value U. S. coin.
Russian empire	58,150	£167,831	62,000	£171,817	$928,000	58,000	$700,000
Scandinavia		32,346	20,400	35,607	328,000	15,000	
Great Britain		129,989	48,500	160,000	1,120,000	60,500	
Hartz		138,022	31,500	138,022	480,000	28,000	
Prussia			21,200		480,000	68,000	
Saxony		198,200	63,600		960,000	80,000	
Other German States	141,000		2,500	198,200	48,000	2,500	8,600,000
Austria		282,654	87,000	286,971	1,440,000	92,000	
France			5,000		80,000	18,000	
Italy		7,444		7,444		25,000	
Spain		227,499	125,000	440,210	2,000,000	110,000	
Australia							
British America			10,000		128,000	9,500	20,000
Chili	18,3000	297,029	238,500	297,029	4,000,000	299,000	
Bolivia	271,300	460,191	130,000	460,191	2,080,000	136,000	
Peru	401,850	1,000,583	303,150	1,000,583	4,800,000	299,000	10,000000
New Granada	5,000	47,929	13,000	42,929	208,000	15,000	
Brazil	1,200	2,003	675	2,227	11,200	1,500	
Mexico	1,440,500	3,457,020	1,650,000	5,383,333	28,000,000	1,700,000	19,000,000
United States		1,864	17,400	73,532	852,000	1,000,000	15,500,000
East Indies		56,265		56,265			
Africa		1,056		1,056			
Various other countries		33,000		33,000			
Total	2,337,300	£6,515,925	2,827,425	£8,788,416	$47,443,200	4,017,000	$53,820,000
Approxi. value in U. S. coin.	$36,250,000	$31,537,000	$43,853 000	$42,536,000	$47,443,300	$62,303,000	$53,820,000

The following estimate of the world's product of silver in 1873 is based upon returns for Germany, Austria, France, Great Britain, Spain, and the United States, and for other countries upon the most recent available accounts: Great Britain and colonies, $1,000,000; Sweden and Norway, $250,000; Russia, $500,000; Austro-Hungarian monarchy, $1,600,000; German empire, $3,000,000; France, $2,000,000; Spain, $2,000,000; Italy (Sardinia), $500,000; Mexico, $20,000,000; Central and South America, $8,000,000; Canada, $900,000; United States, $36,500,000; total. $76,250,000. According to HUMBOLDT and DANSON, the value of silver produced in Mexico and Peru from 1492 to 1803 was $4,152,650,000. The production in Europe during the same period was about $200,000,000. For the period from 1804 to 1848 DANSON gives $1,244,380,794 as the production of Mexico and South America, that of Europe and Asiatic Russia for the same period having been about $325,000,000. For the period from 1848 to 1868 Prof. W. P. BLAKE in his "Report on the Production of the Precious Metals," gives the following estimate of the silver product; Uniied States, $73,000,000; Mexico, $380,000,000; South America, $200,000,000; Australia, $20,000; Europe and Asiatic Russia, $160,380,000; total, $813,400,000. From 1868 to 1875 the product of silver may be approximately estimated at $163,000,000 for the United States, $140,000,000 for Mexico, $56,000,000 for South America, and $63,000,000 for the rest of the world. (None of these estimates include the produce of Japan, China, and Central Asia, of which nothing is known.) We have then, as the grand total of the silver product from the discovery of America to the present time, $7,150,000,000.

Improved Bessemer Plant.†

By JOHN B. PEARSE of Philadelphia.

WITH SUPPLEMENT.

THE works heretofore used in carrying out the Bessemer process have been constructed substantially as follows. The whole works or plant has been divided into three parts. 1. The division in which the metals for conversion are melted. 2. The division in which tbe metals are converted into steel and cast into ingots, or the converting department. 3. The engine and boiler department which supplies the hydraulic power required to move the machinery, and which furnishes the blast used for converting the crude metal into steel. These several departments have usually been so constructed as to be separate from each other, and so as to be practically separate buildings separated by division walls extending to the roof.

The pig iron is melted in cupolas, and is run into ladles mounted on heavy scales fitted to weigh about sixteen tons, and placed at the height of from fourteen to sixteen feet above a horizontal line drawn through the trunnions of the converting vessels. These ladles are usually placed twenty-five to thirty feet behind the converting vessels, and are connected with the latter by spouts or runners down which the melted metal runs. The spiegeleisen used for recarbonizing is melted in air furnaces or cupolas, in the cupola department; similar runners, usually connected with the ladle runners, conduct the melted spiegeleisen into the converting vessels. All these runners pass through a division wall by means of arched openings, and are usually from thirty-five to fifty feet in length. In the Cambria Bessemer Works this division wall between the cupola and converting divisions has been omitted, but the general design is otherwise the same.

In the converting department, the converting vessels, two in number, stand with their mouths toward the cupola department. They occupy, with their chimneys, a central position everyway, being directly on each side of a line drawn across the cupola and converting departments and through the center of each department, and are almost centrally between the two departments. The converting vessels are so placed that the flame, gas, smoke and matter thrown out from the vessel during conversion are directed towards the cupolas and ladles. To protect the latter a large chimney is built for each vessel in the division wall. The matter thrown out from the vessel is thus projected against the back of the chimney where it adheres.

The operation of converting the crude metal into steel is completed with the aid of one ladle crane, and three lifting or ingot cranes. The ladle crane has an arm sufficiently long and strong to support a ladle weighing about twelve tons, when full of steel, at a distance of fifteen to eighteen feet from the center of the crane post. The ladle crane carries the ladle around under the converting vessels and then over the tops of a number of moulds, previously arranged in a circle. The lifting cranes are designed to lift from five to eight tons each, and to cover a circle of about thirty feet in diameter round the post of each crane. Two of these lifting cranes are arranged to swing just over the converters while the third is so placed that its circle just meets the circles described by the other crane jibs. All these cranes are moved vertically by water power, but all other motions are given by hand.

The converting vessels are fitted with a tuyere-box, which carries the refractory bottom lining of the vessel, and also the tuyeres, through which the blast passes on its way up into the melted metal in the vessel. This tuyere-box is usually of large size and great weight, weighing over half a ton without the refractory bottom, or the tuyeres. A railroad track is laid under each vessel from the drying ovens, so far under the vessel that the center of the car may come vertically under the center of the vessel. The tuyere-box, previously prepared with its bottom and tuyers, is placed on this car run under the vessel and is lifted into position by a strong hydraulic lift, which rises beneath it, and lifts it so high that it may be keyed or bolted onto the vessel in its proper place.

The buildings containing the boilers, engine and pumps are usually placed along one side of the converting department, and most commonly on that opposite the side on which the cupola department stands.

The cupola department must be made of great height, so that the cupolas and ladles may be sufficiently far above the converting vessels to secure a steep inclination of the runners, down which the melted pig iron and spiegeleisen flow into the vessels. All the metal and fuel for melting must be lifted to a great height, thus necessitating heavy hoist arrangements and large expenditure of power. The cranes being fixed in regard to location, have but one set of functions; none of the lifting cranes could take the place of the ladle crane, should that break down, nor if the lifting crane that serves the steel ladles should be injured could either of the others replace it. The weight of the tuyere box and refractory bottom is so great that it necessitates special arrangements to handle them, and each converting vessel requires a separate and distinct set of these arrangements as above described.

The plan or design of the plant usually adopted is a dual one, that is, if a line be drawn between the converting vessels and carried each way through the buildings there will be one vessel, one drying-oven, one ladle for molten iron, two cupolas for melting iron, and in most plants, one air furnace or cupola for melting spiegeleisen on each side of the line. This line also passes through the centers of the ladle crane and one lifting crane and has one lifting crane on each side. Each of these sides is, with the exception of the ladle crane and the one lifting crane, which are common to both sides, complete in itself, and, in case of necessity, could be worked without the other side; but the two sides are designed to be worked together, and all the rest of the machinery of the plant is subservient to both in common.

The second principal feature of the designs, heretofore used is, that they are constructed round a central point. The vessels are the center and the whole plant is so arranged that the molten iron, spiegeleisen, scrap iron and refractory materials are all brought to them in various ways, and the steel is delivered from them by means of the steel ladles swung round the circular pit. Around this pit, on one side of which the vessels stand, is conducted the whole work of conversion. In melting pig iron the product is easily carried away down runners without further trouble, but, in the case of steel, we have ignot moulds and ladles many of which are needed immediately round the pit. We have there, further, the drying ovens for vessel bottoms, not so much needed now it is true, but the bottoms are still made up in the immediate vicinity of the vessels. But in front of one oven, as usually arranged, the steel ladles stand, and the moulds in front of the other. The steel ladles after use, discharge their slag and scull under their crane, at one side of the pit, while the hot moulds are distributed round the other two cranes. The central position of the steel converting details is thus disadvantageous, for the heat arising from the hot moulds and glowing ingots greatly inconveniences the men. Besides this the inward movement of the material brought in to the center interferes with the removal of the debris, and the *debris* itself of each operation, is also more or less in the way of the other operations.

From the above descriptions it is evident that the design of the Bessemer plant, usually employed, is of such a nature that any increase of capacity must take place by the union of two converting vessels and their necescary appurtenances. It would be far too expensive to build for one vessel the parts usually accessory to both vessels in common.

The object of my improvements is chiefly to diminish the relative cost of plant per ton of steel, and the amount of the orignal total cost of erection, to reduce the cost of repairs by simplifying the apparatus employed, and also to arrange each part of the Bessemer plant, and the whole design of the combination of the several individual parts, so that each division of the operations necessary to conversion, shall be carried on in an entirely separate place, so situated that each separate division may be reached from the outside of the building, or from a space equivalent to the outside.

With this object I unwind, as it were, the whole circumference of the pit, bring the cupolas down, and get my operations in a longitudinal line, instead of in a number of radial lines converging to a common center. The iron comes in at one end, and goes out as steel at the other end. For these purposes I so arrange the converting plant, that the whole of the machinery, including blowing engines, pumps, boilers, and all other necessary parts, may be placed under a single roof of moderate span intended to be nothing but a shed made fire proof. The only raised floors employed, are the platforms required to charge and work the copulas, the highest of these platforms, being not more more than eighteen or nineteen feet above the ground, and all of them in one corner of the building. The cupolas stand on the ground, and the molten pig is tapped out of them into an ordinary foundry ladle of large size, which also rests on the ground. I employ small cupolas, also resting on the ground, for melting the spiegeleisen for recarbonization, and I arrange a crane so that it commands all the machinery in the building, except the cupolas themselves, the blowing engines, and the boilers.

The crane lifts the ladles containing the molten pig iron, and spiegeleisen,

* A paper read before the American Institute of Mining Engineers, at the Cleveland meeting, October 28, 1875.

† A Paper read before the Meeting of the American Institute of Mining Engineers at Cleveland, October, 1875.

and automatically pours their contents into the converting vessels, without the intervention of runners of any kind. The ladle and contents are weighed on the crane, and the diminution of weight as the pouring goes on, is indicated so that by watching the index of the weighing apparatus, the required quantity may be readily poured out. Regular steel ladles receive the steel from the vessels direct, and are carried away by the crane to the ingot moulds. One traveling crane, arranged as in the drawings before you, will perform all the operations requisite for the manufacture of a large quantity of steel; if a very large production is intended, two traveling cranes can be used, or in either case equally good arrangements can be made with a jib crane. I put the travellor in the drawing, because it is by far the handiest crane of the two.

The service of the vessels includes renewing the vessel bottoms when the refractory lining and tuyeres have been burnt away, and I arrange my plant so that the crane pulls the car out of the drying oven, and then, by means of a long peel or lever, of suitable construction, raises the fresh tuyere plate, and refractory bottom, and carries them into the proper position for attachment to the converting vessel. The worn out bottom was of course previously removed by means of the same lever or peel.

In order to make the tuyere box and bottom very light and convenient to be thus handled, I have designed a special form of tuyere box, which would be best designated by being called a tuyere plate.

The converting vessels are so arranged, that they need no chimneys of any kind, and that the flame, smoke, gas, and matter thrown out from the converting vessel, during the process of conversion, goes directly into the open air, the heavy matter falling on the ground outside of the building.

I provide, as you see, a place for relining the ladles, so situated as to be entirely accessible from the outside, and quite out of the way of all other work. The drying ovens and the engines, boilers and pumps are disposed in a similar way so that coal may be taken to the boilers, and refractory material to the drying ovens from the outside; either by railway, car or on carts without interfering in any way with other work.

The cupolas are placed as close to the converting vessels as is consistent with comfort and convenience, but, at the same time, so that they may be in free communication with the outside. The pig iron, spiegeleisen and fuel can thus be raised to the cupolas in any convenient way from the outside, and the slag and other debris resulting from the operation of melting go directly, in the shortest way, to the outside.

The ingots are cast in an entirely separate and distinct locality out of the vicinity of the vessels and easily accessible from the outside of the building. This is done in order that the heat resulting from the cooling off of the hot ingot moulds, after use, may be dimished as much as possible. Further, this arrangement enables us to perform the hot operation of casting the ingots away from the vessels, which are themselves rendered very hot by the process of conversion. The heat to which the workmen are exposed is thus reduced as far as possible.

The traveling crane is so arranged that it can itself, if desired, convey the hot ingots to the heating or in this case cooling furnaces, even at a long distance. Or it can pile the ingots where needed or handle them as may be convenient.

I design, as you see, the blowing engines, boilers and pumps in such a way that they go into a small space and into a convenient position with reference to converting vessels and cupolas and to the track laid in the building for the removal of ingots and the facilitating of repairs.

All divisions or parts of the operations incident to the conversion of iron into steel, are so arranged that each of them, except partly the melting of the crude metal, may have a location such that no other operations are carried on opposite to it, thus securing great convenience and freedom, from the fact that the operations are all carried on in areas adjacent, but not opposite.

An incidental, though important feature of my design is, that the steel for ingots or any metal in course of handling may be weighed while being poured, without further preparation. In the ordinary plants this cannot be done. There are many directions in which this feature can be made useful.

The traveling crane may be run at any speed, and with one of about forty feet per minute; the iron ladles can be taken from the cupolas to the vessels and emptied in from one to one and one-half minutes. But a speed of one hundred and fifty or two hundred feet per minute is perfectly admissable for travel. One hundred to one hundred and fifty feet for cross motion of crab and fifty feet for lifting ordinary weights. With these speeds a great amount of work can be done. One Brown's steam and hydraulic traveler, in the works at Landore, handles the ingots from eight to ten Siemens' furnaces, doing all the work alone.

In regard to the cost of the plant above described, I have detailed estimates which show that it can be built for from sixty-five thousand to eighty thousand dollars, depending on locality, to produce an average of at least one hundred and fifty tons per day. It can be started with a single vessel, two cupolas and the lowest basis for say sixty to seventy-five tons per day for forty-five thousand dollars and its capacity can be enlarged, up to the capacity of the cupolas, simply by extening the building in length. The estimated savings on all items, as compared with ordinary large plants, is not less than two dollars and fifty cents per ton, in addition to the large saving in interest. All dimensions can be ascertained by measuring the plates, which are drawn to scale.

DISCUSSION

Mr. A. L. HOLLEY said that there were some good details in the design of Mr. PEARSE. It was certainly desirable, as far as possible, to decrease the very large cost of a Bessemer plant, now about $300,000 for a plant capable of producing 1,300 tons of ingots per week. He thought however that Mr. PEARSE's plan was defective in grouping, and that he would be disappointed in his attempt to realize from one traveling crane, the work performed by 10 hydraulic machines. Mr. HOLLEY further remarked regarding the estimated cost ($65,000 to 80,000) of the plant, that he thought that here too, Mr. PEARSE would be disappointed. In the erection of the EDGAR THOMPSON Steel Works, they had found that over and above the cost of buildings and of all the machinery free on board at the builders works, the cost of setting up and finishing and putting the plant in running order was $80,000.

Mr. ROB'T W. HUNT thought that the plan of removing the casting pit to one side, would not relieve the men materially, and that they do not now suffer any great inconvenience from the heat of the operation. He further objected to lifting of melted metal, when avoidable, and thought to avoid this a greater height of cupolas was desirable. He agrees with Mr. HOLLEY, in thinking that one traveling crane would be inadequate to the work of the plant. He thought moreover that the labor would be more expensive.

Mr. PEARSE replied that his principal object was to cheapen the cost of erection of a Bessemer plant, which in its present state is rather apt to repel than attract investors. His plant would permit the erection of works in new districts, and would also permit experiments to be carried on at small expense. As to the traveling cranes, he thought that they would, in time, drive out jib cranes, as they are now doing, for many purposes, in England. He cited instances where traveling cranes were doing prompt, efficient and heavy work. If however, one crane was not found sufficient, two could be used. Moreover, jib cranes could be used with his plant if thought desirable.

In reference to the remarks of MR. HUNT, as to the difficulty of handling melted iron, he found not the slightest trouble in foundries, where steam cranes handle ladles containing twelve to fifteen tons of iron, and with the greatest ease. It is thus a matter of every day work, and objection on this score is not well founded. But further, in the second plant of the Pennsylvania Steel Company, a design was made for handling a movable ladle on a truck and track, laid before the cupolas, and though the building has not been finished, yet this plan can be seen in operation in the Bessemer works of the Bethlehem Iron Company. Here the cupolas are about one hundred to one hundred and fifty feet from the vessels, and the spiegel-furnace is still further away, and the ladle is on a truck which is pushed the whole distance by a locomotive, and placed on the platform of a hydraulic lift, which lifts truck and ladle to the working platform around the vessels. This plan is entirely successful for heavy seven-ton heats, and any handling proposed in his design is far less in amount, and more easily directed, than that done so easily, every three-quarters of an hour, all day long, by MR. FRITZ.

As to amounts stated in estimate, they were carefully calculated at engineering works, and he had reason to believe that at present rates, they can be materially reduced. An estimate of his plant is not comparable with an estimate of a plant five time's its size. In a large plant the buildings and foundations and roofs alone, cost about what his improved plant can be built for.

He has actual figures on all the facts, and has every reason to believe that his offers are *bona fide*, as those bids used, were many of them, made to the Pennsylvania Steel Company, two or three years ago. The amount may seem very small, but a comparison of the specifications of the two plants (ordinary and improved), and a view of the number and design of parts used in his plans, will convince anyone that his total is *not* under estimated.

As to cost of steel per ton, the cost of the plant submitted is so much less, that its product need not be nearly so large as is necessary in ordinary plants, in order to make steel cheaply. Hence with an ordinary product, the new plant will, it is believed, make cheaper steel.

The Production of the Prussian Mines in 1874.

FROM statistics published in a late number of the *Deutsche Industrie-Zeitung*, we learn that the total yield of the mines in Prussia, including salt works, was, in 1874, 44,347,800 tons, representing a value of £21,480,121, against 45,149,421 tons, of the value of £22,958,301, in the previous year. The year 1874, consequently, shows a decrease in quantity of 1·66 per cent. ; in value of 6·44 per cent. This decline was mainly in the production of the iron ore mines and of the coal mines. The yield of iron ore fell from 3,555,005 tons in 1873 to 2,540,886 tons in 1874, the latter year thus showing a decrease in the production of no less than 1,014,115 tons, or 28·53 per cent. Corresponding with this decrease in quantity, there was a decline in value against the previous year of £776,348, and a reduction in the number of miners of 10,747 men. The quantity of coal produced in 1874 amounted to 31,938,683 tons against 32,347,709 tons the year previous, thus showing a decrease of 409,226 tons, involving a decline in value of £838,037. The decrease in value of the iron and coal production (1874 against 1873) is, consequently, no less than £1,614,421, an amount higher than the decrease in value of the total production of the Prussian mines, amounting only to £1,478,180, represents. The causes of this phenomenon must be sought in the steady progress of a few other branches of mining—brown coal, lead ore, and zinc ore—which make up for the great deficiency in the iron ore and coal production. The salt works show a total production for the year 1874 of 4,305,664 cwt. of salt, of the value of £292,118, against 3,822,574 cwt., representing a value of £257,300 the year previous. This is, consequently, an increase in this branch against the preceding year, of 483,154 cwt., or 12·64 per cent., of a value of £34,718, or 13·53 per cent. The number of mines at work were as follows :

	1873.	1874.
Coal mines	506	501
Brown-coal mines	577	549
Iron ore mines	1,539	1,121
Zinc, lead, and copper ore mines	262	262
Other mines	79	92
Salt works	32	31
Totals	2,995	2,556

In 1874, therefore, 439 mines (of which 418 were iron ore workings) and one salt work less were being worked than the preceding year. The numbers of workmen employed were:

	1873.	1874.
Miners	241,196	239,884
Workmen employed in salt works	1,757	1,857
Totals	242,953	241,741

or 1212 men in 1874 less than in 1873.

Compressed-Air Locomotives.—The invention of Mr. LEON RIBOURT, of Altorf Canton Uri, Switzerland, relates to locomotives worked by compressed air provided with pressure regulating apparatus, which is applicable where steam or gases under pressure are employed to produce motive-power. The locomotive is like one of ordinary construction, having, instead of a boiler, a large and strong reservoir, which is charged with compressed air, and having large cylinders so as to work with moderate pressure under that of the partly exhausted reservoir. Between the main reservoir and the cylinders are placed the regulating apparatus and a small subsidiary reservoir in the course of the pipe from the regulator to the cylinders. The regulator consists of two pistons connected together fitted to work in a cylinder, open at one end to the air and at the other end communicating with the subsidiary reservoir, while the middle space, between the two pistons, communicates with the main reservoir, and also by side holes with the subsidiary reservoir, these holes being governed by a slide attached to the pistons. The pistons are pressed inwards by the atmosphere and by an adjustable spring, and outwards by the fluid at the working pressure in the subsidiary reservoir, and, according, as the latter pressure exceeds, or falls short of, the atmospheric pressure, aided by this spring, so the slide covers or uncovers, more or less, the holes in the cylinder; and thus, notwithstanding considerable variation of pressure in the main reservoir, the working pressure, in the subsidiary reservoir, is maintained constant, or nearly so, and within limits may be varied by altering, by an adjusting screw, the force of the spring.

The Theory of Illuminating Flames.

By KARL HEUMANN.*

THE views of different observers are widely opposed. STEIN believes that the disilluminating effect of the admixture of indifferent gases is the result of dilution only, which permits the oxygen of the surrounding air entering the flame, and transforming all the carbon into carbonic oxide. R. BLOCHMANN is of opinion that the cause of the disilluminating effect of neutral gases, is that a relatively smaller quantity of oxygen comes into contact with the combustible constituents of the flame; and that in the flame of BUNSEN'S lamp, the entrance of oxygen into the inner zone of combustion causes decomposition of the gas, giving rise to hydrogen and carbonic oxide; therefore, gases that under ordinary circumstances burn without illumination.

FRANKLAND'S hypothesis is that the illuminating power of the gas flame specially depends upon its degree of condensation. In opposition to these, F. WIBEL shows that a flame rendered nonilluminating by air or an indifferent gas, becomes again brightly luminous when the "burner" is heated to redness. In this case, the dilution of the gases of the flame and the amount of the absorbed air are increased; nevertheless, the flame becomes luminous. WIBEL draws conclusions from this, in direct opposition to the views of those above cited, and goes, I think, to the opposite extreme. His thesis urges that it is not the *dilution*, but the *cooling* of the interior of the flame by the entering gases, that robs it of light. This certainly cannot apply to the flame of the BUNSEN lamp, for if he is correct, the BUNSEN flame should be cooler than the luminous one, whilst daily experience proves that the blue burning flame possesses a much higher temperature.

The oxygen of the admixed air cannot be held to be the cause in this instance; for heating the burner could not alter the relation of the gases, yet the flame thereby becomes luminous. Perhaps it may be suggested that the effect of heating the burner is to restore the temperature that had been lowered by the incoming oxygen, but this is contradicted by the fact that the flame mixed with air is much hotter than the luminous one. The possibility of a lower temperature is therefore not admissible.

It remains therefore to recognize as a fact that the dilution of combustible gases is one important factor, and can alone—without reference to the temperature—disilluminate the flame. It must be further admitted that a mixture of illuminating gas and an indifferent gas requires a higher temperature to become illuminating, than the undiluted gas alone does. WIBEL'S experiment does not therefore prove that the cooling of the flame is exclusively the cause of the disillumination, for by the admixture of indifferent gases its composition is very materially altered. The truth therefore may well lie between the opposing theories of the different observers, and the disillumination of a flame containing carburets by the introduction of air or an indifferent gas, depends not only upon the cooling effect, but also upon the dilution of the gases of the flame, which dilution may have formed a gaseous mixture needing a higher temperature to burn luminously than the illuminating (un?) diluted flame itself previously required.

The support that WIBEL'S theory derived from the behavior of a flame from coal gas and oxygen, is explained by my view in the most convincing manner. As WIBEL found, such a flame is extremely difficult to disilluminate, because its temperature in the presence of pure oxygen is an extremely high one. The cooling effect produced by the cold oxygen entering, as well as the absolutely higher temperature required to enable the gaseous mixture to burn luminously, is nearly if not entirely compensated for by the intense heat produced by the concentrated, energetic combustion in the presence of pure oxygen; therefore the disillumination is rendered so much the more difficult. That it ultimately can be produced by a very strong stream of oxygen, and by means of a net of wire gauze, may readily be understood.

The introduction of pure oxygen in a suitable manner into a flame renders it very illuminating by producing an excessively high temperature, whilst the prejudicial dilution that would be caused if air had been used, does not occur. Too much oxygen, or too little, can produce the same conditions that dilution by an indifferent gas would do; in the one case the oxygen penetrating the small flame and diluting it excessively, in the other the combustion being too languid to afford the needed temperature.

EXPERIMENTS GIVEN TO SHOW THE EFFECT OF EXCESS OR INSUFFICIENCY OF OXYGEN.

An inverted flask filled with oxygen; into it introduce a small gas flame from the jet of a blowpipe. At first the outer portion of the flame expands enormously, consuming the lighting part of the flame, which decreases until it becomes only a little bright point. After a time, when the products of combustion have diluted somewhat the oxygen, the bright point increases until it reaches the mantle of flame; the brightly shining flame presents then the appearance that it would do in ordinary air. Gradually the products of combustion dilute still more the oxygen, the temperature of the flame sinks still lower, the flame becomes blue, then nearly invisible, and finally goes out.

To show that *cooling* alone can render a flame non-luminous, direct a small luminous gas flame against the bottom of a platinum dish or capsule, so that the flame will spread itself and become *blue*. Thus far, this result cannot be attributed solely to the *cooling* effect, since spreading out the flame might also mix it with the air and dilute it. But if the capsule be heated on the opposite (upper) surface to redness with the powerful flame of a large BUNSEN'S burner held horizontally, then with the rising temperature of the capsule, the flame beneath it will become brighter and brighter, until it will finally reach its original brilliancy. The capsule must of course be clean and free from traces of soda from the fingers. This proves that the disilluminated flame is again made luminous, simply by the temperature of the metallic plate. If the BUNSEN flame be withdrawn, the small gas flame will remain luminous for a short time, and then, as the metal cools, it will become again blue.

In these experiments the question has not here been discussed upon what chemical or physical changes induced by the diluting or cooling, the disillumination depends; nor has the disputed point whether the material that heated to redness becomes luminous—be it carbon or dense vapor—been touched upon; but as concerning the opposing theories whether cooling or dilution is the cause of disillumination, it seems to me decided, that at least three different causes, each by itself, can cause disillumination. In most cases, two or three act simultaneously. I give as the result of my observations that *disillumination can occur*—

a. By cooling.

b. By dilution. The mixture of illuminating and neutral gases can only burn luminously when the flame possesses a much higher temperature than the ordinary luminous gas flame

c. By energetic oxydation of the illuminating material (experiment 1).

* HENRY PEMBERTON, ESQ.—In the *Journal of the Franklin Institute*.

And the restoration of the lighting power will be produced.

a. By access of heat (experiment 5).

b. By increase of the temperature of the flame produced by heating mixture of gases or of the indifferent gases before their combustion.

c. By dilution of oxygen with indifferent gases.

ON THE DISTANCE BETWEEN THE FLAME AND BURNER.

R. BLOCHMANN first investigated the phenomenon that the flame does not immediately touch the burner of a gas jet nor the wick of a candle. This is seen more clearly with a small flame than with a large one. As the gas jet is turned down, the relative distance between flame and burner increases. The distance between is much increased when an indifferent gas is mixed, such as nitrogen, carbonic acid, etc. BLOCHMANN thought therefore that the *dilution* was the cause thereof, and explained the fact of the greater distance by stating that a certain fixed proportion must exist between the combustible portion of the gas and the air, and as the dilnted gas required more volume for the same combustible quantity, so must a greater volume thereof be mixed with the air before combustion would occur; that is to say, the space between the burner and flame must be larger. This somewhat forced explanation of BLOCHMANN is, I think, wrong, for any cold object held in a flame produces a space between the flame and it. This space is the larger, the more diluted the gas.

It is more easily blown out the more it is diluted. A flame diluted with much carbonic acid will stand several inches above the burner, and be blown out with the slighest puff.

If the burner be heated, the flame will approach the burner more and more nearly as the temperature increases. If surmounted with a platinum tube heated to redness, it will approach and attach itself to the burner. The opening produced in a diluted gas flame by a cold iron rod will close in proportion as the rod be heated; if the rod be made red hot, it will close completely. The above may all be noticed in an ordinary gas flame, but not so clearly or decidedly.

The space between the burner of a diluted flame being larger, is dependent upon the fact that the temperature is lower; for at the instant of combnstion the evolved heat has to spend itself through the mass of indifferent gas. As the heat of the flame is low, any cool object will extinguish it in its immediate proximity by the further reduction of temperature.

It is thus beyond doubt that in all these experiments the colling effect produced by the burner or other introduced cold object, is the *sole* cause of the above mentioned intermediate space.

CORRESPONDENCE.

Colorado Mines.

CENTRAL COLORADO, November 28, 1875.

THE Central gold mines in Gilpin County comprise the leading gold district of Colorado. Their production in 1874 was $1,525,447 in gold, $50,965 in silver, and $55,451 in copper. The present season will show a large increase. The silver and copper given above came from the Boston and Colorado Smelting Works, together with about $500,000 in gold taken from the same ores. The same establishment also shipped over $1,000,000 in silver bricks obtained from the ores of the silver producing counties.

There is a general revival in and about Central in mining circles, caused by recent successful operations and an unusual number of "rich strikes" among the mines, large and small. The twenty-one stamp mills now running have had such heavy demands upon them lately that several mills that have been idle are starting up, and two large sized ones have been built this fall.

The expenses of mining and milling are now only one-half what they were a few years ago, and double the quantity of gold is saved under the stamps, and, consequently, the quantities of low grade ores now available and profitable are many times what they once were.

The deep mines are nearly all being worked again, and their shafts are being driven downward as rapidly as possible. All of what are known as the leading mines are down from 450 to 850 feet.

The four mines worked most extensively are the Gregory, Bob Tail, Gunnell and Kansas. Each of the first three have yielded millions, and the Kansas has done nearly as well. The latter has now on the Monmouth property the richest deposits of ore in the county, except that on the Miller claims on the Gunnell. Next in rank as producers to-day are the Leavitt, Kent County, Gregory Second and Burroughs.

The Gregory employs 190 men, including the mills, which have over 100 stamps. The Briggs Brothers' claims supply 60 tons of ore daily, yielding from $7 to $10 in the stamp mills. The Smith & Parmelee property gives about one-half that yield, and the Narragansett has begun to yield valuable quartz once more.

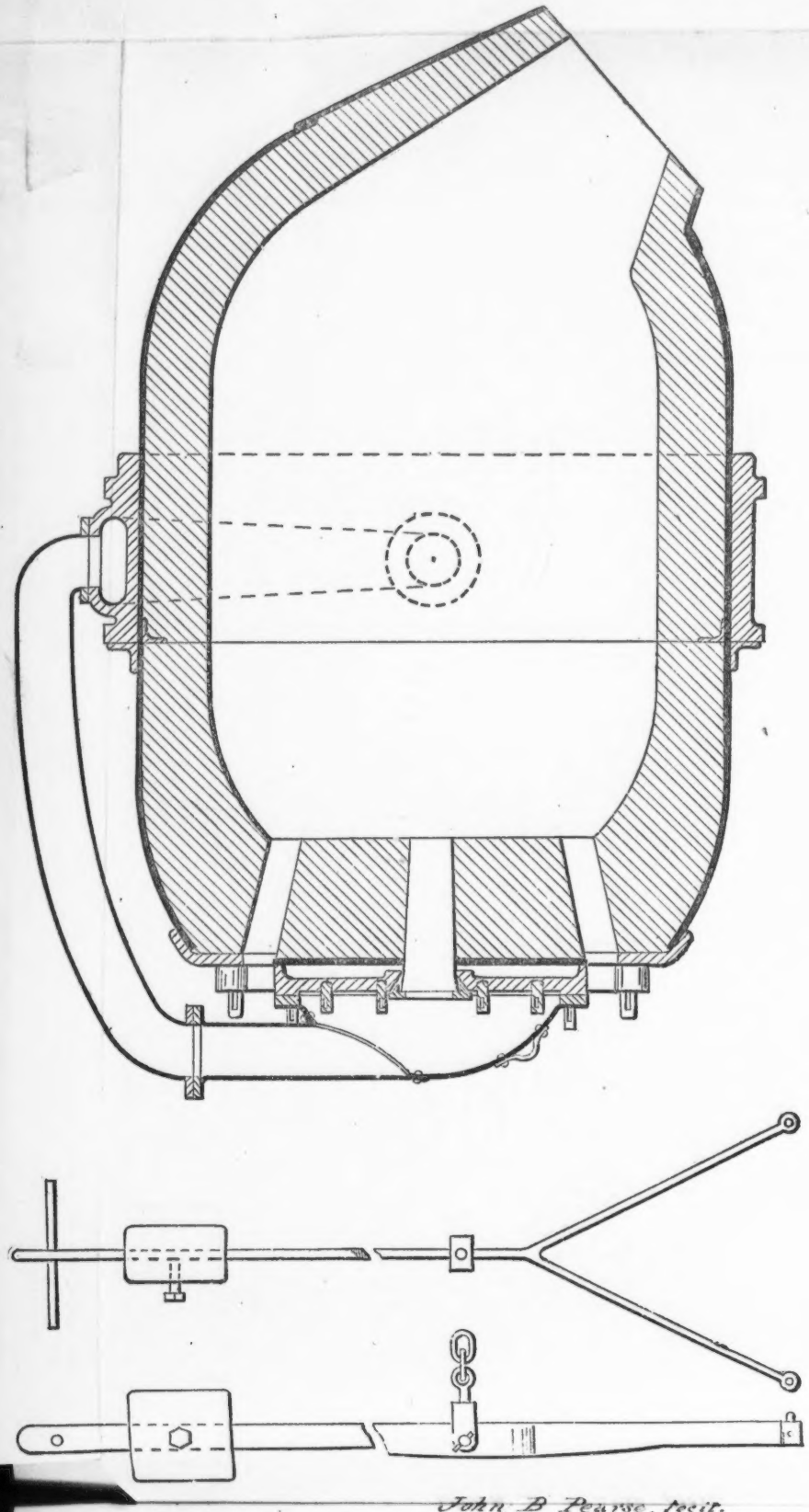
The Bob Tail, mainly operated by a company of the same name, yields about 70 tons daily—average yield $10 per ton. Two other parties are working claims on this lode, one of which is paying largely for the first time. A much larger yield will soon be obtained from the entire lode.

The Leavitt is not mined as extensively as last year, but soon will be, as very rich pay was found last week. The owner, B. S. BUELL, has 3,000 feet of continuous territory on this, one of the broadest and most valuable lodes in these mountains, and when fully operated gives ore sufficient to run the sixty stamp mill built over the main shaft.

J. C. FAGAN has 2,350 feet on the Kansas and Burroughs lodes, either by purchase or under lease, and employs nearly 100 men. The richest ore comes from the Monmouth Company's property. Further east two parties are again getting valuable quartz. On the Gilpin claims, and on the Burroughs good pay has been struck. The Ophir-Burroughs has yielded but little since SULLIVAN & Co. leased it last March. The shaft is the deepest in Colorado, being down 850 feet, and the completion of the present contract will make its depth 906 feet. Another body of rich ore will probably soon be met with.

The Gunnell lode is worked for a distance of nearly 3,000 feet. The eastern 1,200 is operated by JOHN SCUDDER and is paying. A Central firm are leasing the Gunnell Gold Company's claims, the shaft being 700 feet deep. At present most of the ore raised through the shaft has been coming from the Souchard claim, and now comes from the Miller property by means of levels driven westward at depths of several hundred feet. Another party has leased the Miller property and is sinking the 140 foot shaft with all possible speed to get into the rich ore below, which already begins to appear. This ore, of which the parties on the Gunnell Central raise and mill 30 tons daily, yields from $38 to $55 a ton, showing a large vein of unusual richness. Besides this, there is much high and low grade ore, the former being sold to the smelting works, which buy some thousand dollars worth of ore monthly from all of the above mines.

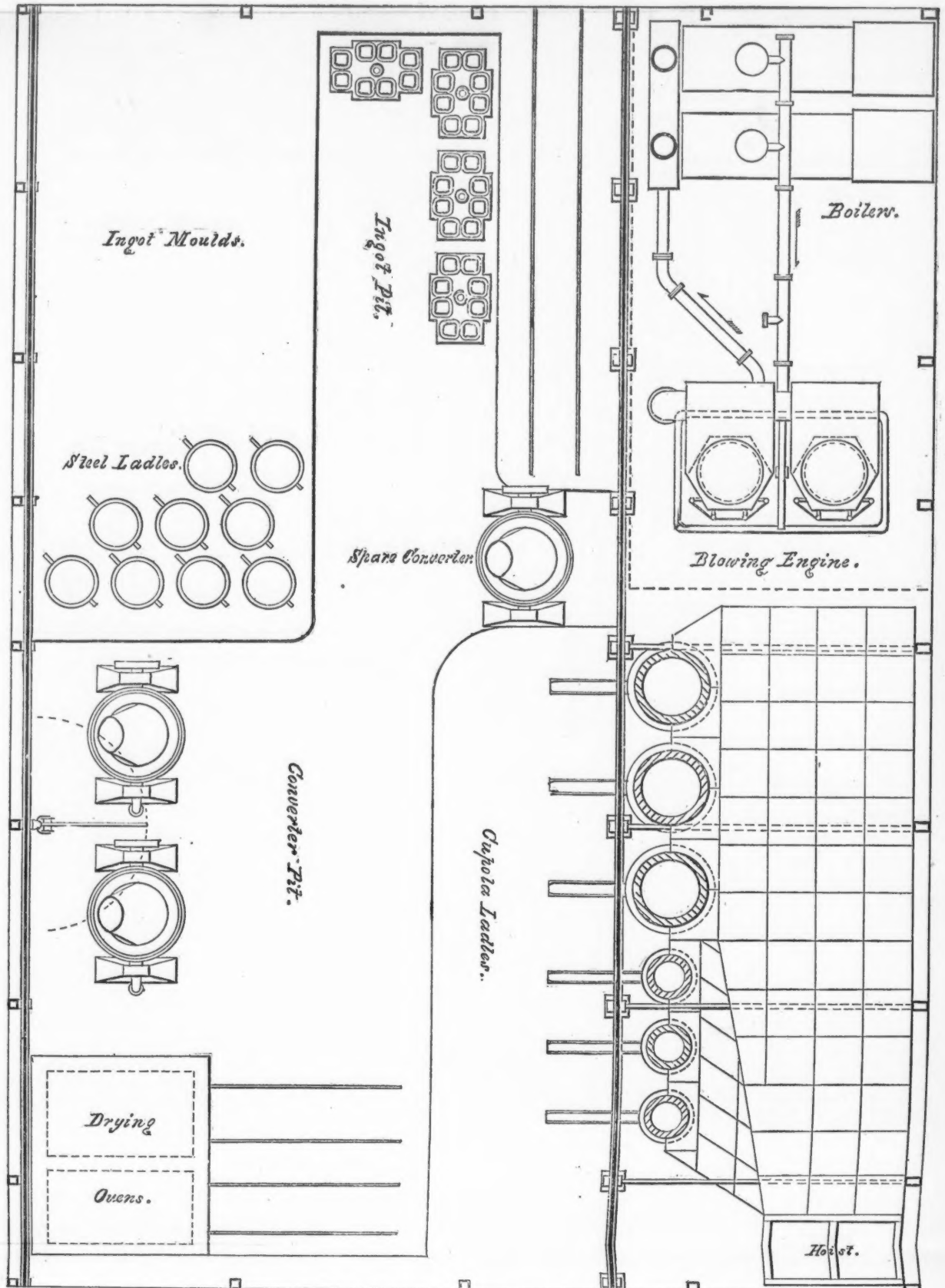
Converter with Improved Bottom and Peel.



John B Pearse, fecit.

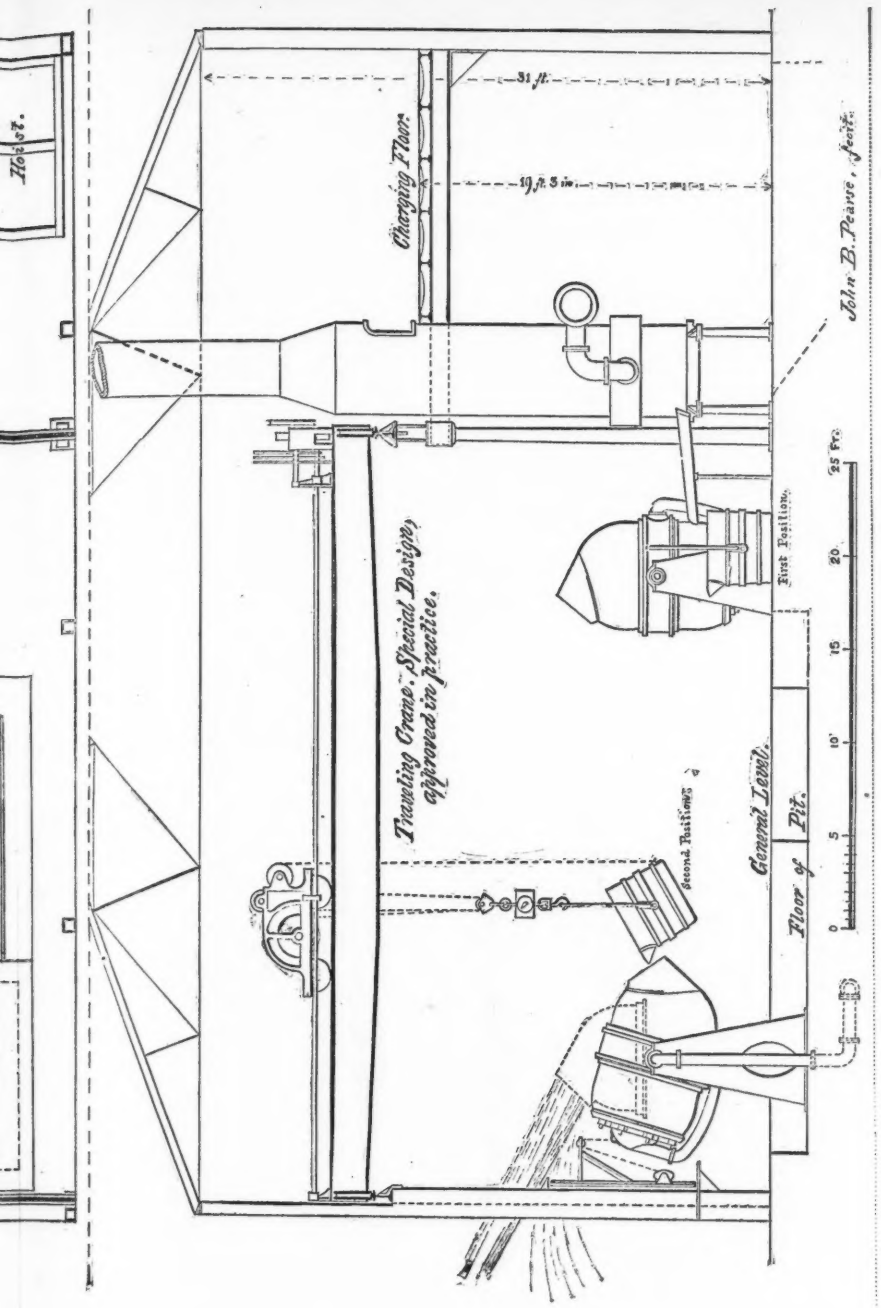
Ground Plan and Section of Improved 5 Ton Bessemer Plant.

Building 90 ft by 62 ft.



ENGINEERING AND MINING JOURNAL

NEW



IMPROVED
BESSEMER PLANT

DESIGNED BY

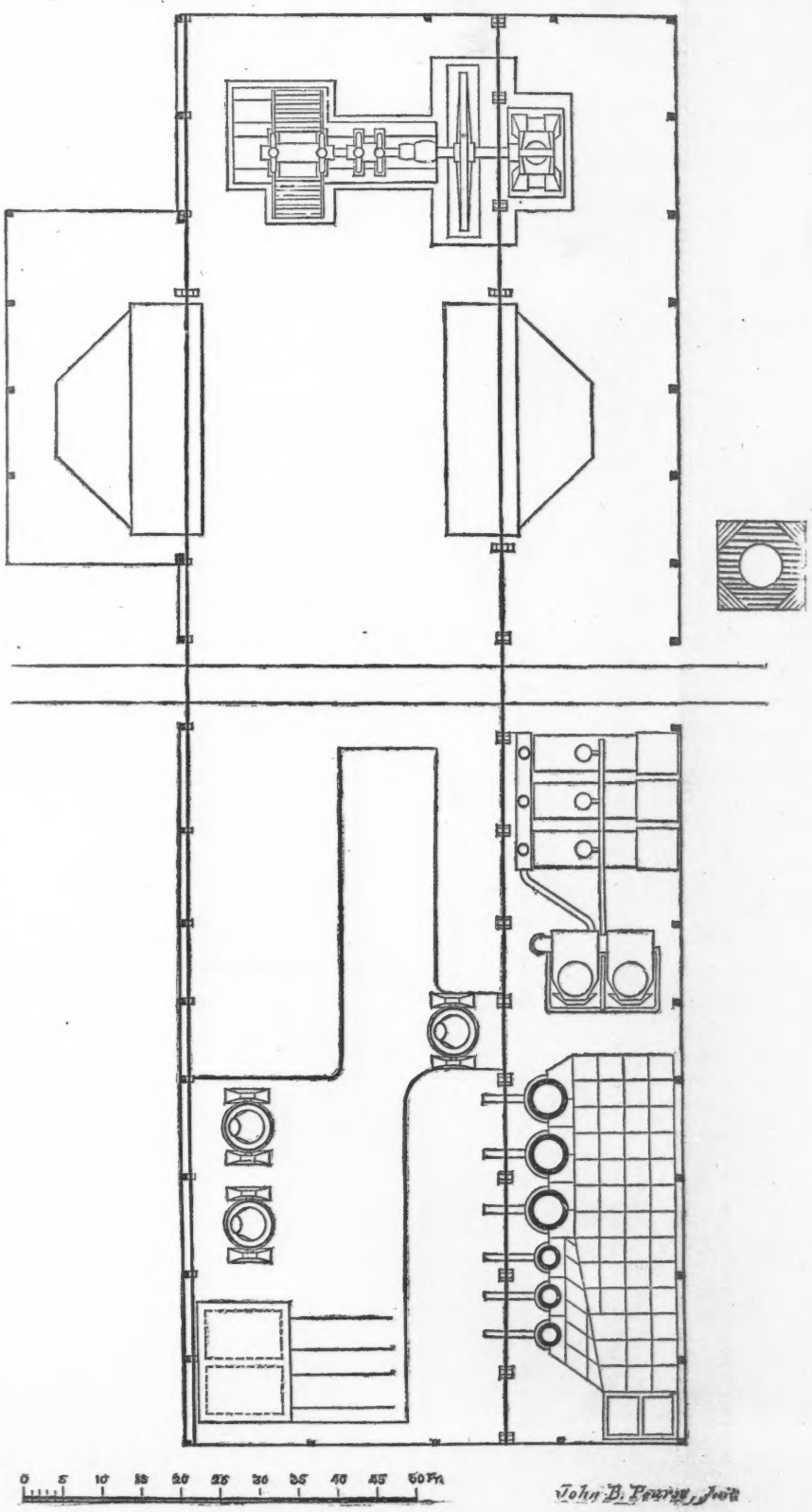
JOHN B. PEARSE,

METALLURGIST AND ENGINEER,

No. 1439 Walnut Street,

PHILADELPHIA.

Improved Bessemer Plant combined with Rolling Mill.



The Gregory Second and Kent County have lately been sunk 100 feet deeper, and now show very large deposits, four feet wide, running from $15 to $20 per ton. The Kent County yields 25 tons daily. The Fiske lode in one locality is steadily producing a limited quantity of ore that pays. Among other mines that were not paying before this month, but are now, and show rich pockets or bodies of ore, are the Lilly, Mountain City, Dike, Jones, Barner, Alps, Nimrod and others.

The Quartz Hill tunnel is now 900 feet long and has 200 feet to go to cut the famous Illinois and Roderick Dhu belt of lodes on this hill.

The La Crosse tunnel is nearly of the same length and headed in the same direction, but has not been driven forward lately. Several other tunnel enterprises are projected.

Some of the leading operators mill and mine their ore at an expense of $5 per ton, others have an outlay of one or two dollars more where they have no mills of their own. The narrower as well as the less developed mines have a total expense of from $7 to $10 per ton. From this it will be seen that one-half the yield of some of the larger mines is clear profit. Parts of the Kansas and Gunnell are doing better than this.

The silver districts in all parts of the territory are progressing rapidly. The Georgetown mines will increase on their product of last year, which was over two and a quarter millions. The Mount Lincoln mines of Park County will give about $700,000, and those of Cariboo will yield about half a million.

A considerable part of the increase of 1875 over 1874 in the bullion yield of Colorado will come from the newer districts, and the total will be nearly $7,000,000 in gold and silver as against $5,188,510 in 1874. Gilpin County will largely increase the gold product. The value of coal mined wi l approach $2,000,000 in this territory in 1875.

New reducing, smelting and chlorination works are being erected in all parts of the Territory, and there is a lively competition at some points between home and Eastern buyers. The newer districts are, for the most part, destitute of any ore treating facilities, and their development will, of course, be slow and difficult until this want is supplied.

At Georgetown TEALE & EDDY'S concentration works are doing good service in working over low grade silver ores and "dump piles," and the new Krom dry concentration works are nearly completed. This latter process worked successfully there on certain grades of ore previous to the destruction of the works by fire. Concentration is the great necessity among these mines. F.

Gwynne-Harris and Lowe Gas Processes.

TO THE EDITOR: Sir—The comparison between "The GWYNNE-HARRIS and LOWE, Gas Processes," published in your Journal of December 11th, 1875, requires a little explanation, which I hope you will allow me to make.

The LOWE process at Utica was running in the works of an old established company, having a large consumption of gas, and therefore affording an opportunity for the full use of his apparatus. But the GWYNNE-HARRIS process at Poughkeepsie, was then running in the works of a new company, just started, and whose consumption in September, when the comparison is made was only 38.823 feet per day, and very far short of the capacity of the benches then running.

For instance, the boiler and superheater are sufficient without any additional expense to produce 150,000 feet of gas per day: while the two benches then running were capable of making about 70,000 feet, without any additional fuel or labor, and the only increase of expense would be 17 lb. of anthracite coal, and about three gallons of crude petroleum per 1.000 feet of gas, and as the consumption of gas increases, so as to require another bench, the increase of expense is simply about 2.50 per day for fuel, and the rate of anthracite and oil per 1,000 feet of gas as above given.

From prudential motives the company have employed two men, day and night, from the beginning (neither of whom ever assisted in making a foot of gas previously) and the same labor is sufficient, with great ease to make 150,000 feet of gas per day.

The "bituminous coal" mentioned, was not used for making gas, but solely for fuel. I think it is apparent, therefore, that the comparison referred to, cannot be considered a criterian by which to judge of the two processes.

H. P. ALLEN, 4 Warren Street.

NEW YORK, December 14, 1875.

Notes.

West Virginia Black Band Iron Ore.—A corresdondent informs us that an analysis of samples of this ore from the Kanawha Valley, was recently made in the laboratory of the School of Mines, London, and it was found to yield 32.8 per cent. of metalic iron.

Seven Steam Canal-boats have successfully plied the Chesapeake and Ohio canal this season. The Alexandria *Gazet'e* says that it is rumored there, that some gentlemen of capital are about to engage in the building of steam canal-boats on a large scale. Rumors of a like nature have been prevalent here, and there is doubtless something in them.—Cumberland (Md.) *News.*

Short-weight Coal—How the Poor are Swindled.—For some time past complaints have reached police headquarters of men who made a business of selling what purported to be tons of coal at prices varying from $5 to $6, but which proved to range but little over sixteen hundred pounds. The complainants were principally hard-working people in moderate circumstances, and the swindle was most noticeable in the Tenth police district. Captain HEINS was notified, and, in conjunction with Lieutenant BEALE, set about watching the itinerant coal dealers. Officer RUSK was detailed in citizens' clothing, who soon had evidence which he thought would justify him in arresting EDWARD TYE, JOHN DAILY, DOMINICK MCBRIDE and JAS. TRIMBLE, who were accordingly taken into custody. The prisoners had a hearing at the Central Office yesterday afternoon.

Mr. W. S. WILLIAMS, 1717 Gratz street, testified to buying coal from TYE upon three occasions, paying $6 to $6.50 for what was represented as a ton.

Officer RUSK swore he weighed the coal and found one load to consist of 1,845 pounds.

Mrs. FLUCKE and another woman were called, but being of French extraction but little could be made from their testimony beyond the fact that they bought coal by the load from DAILY at $5 per load.

Officer RUSK here stated he believed the witnesses had been tampered with, as they had told him positively that the coal was represented to weigh a ton. The loads weighed 1,690½ and 1,803 pounds respectively. He had been told that the men delivering it had received fifty cents per ton to put it in, dumped it upon the pavement and then left. One of the carts had a false bottom.

Mrs. HINDLE, 1644 Adler street, swore she had bought from TRIMBLE what he represented as a ton of coal for $5.50 It weighed 1,816 pounds.

MARY BENNY also bought a load from defendant. Its weight was 1,763 pounds. She paid $5.75 for it.

GUSTAVUS SELSER, 1472 Cook street, purchased a load from MCBRIDE for $5. In this case the supposed ton ran 1,785 pounds.

When TRIMBLE was arrested he is alleged to have told Officer RUSK that he had been in the "ring" ten years and was never captured before. The officer thought that about 200 persons were engaged in the short-weight business. He had weighed the coal in the above instances and found it short. The figure he had given was correct.

Parties from whom the scales had been barrowed swore they were rightly adjusted.

TRIMBLE was held in $1,000 and the other prisoners in $500 bail each, to appear at court.—Philadelphia *Record.*

STATISTICS OF COAL PRODUCTION.

Duties.

Anthracite free, *Bituminous*, per ton of 28 bushels, 80 lb. to he bushel, 75c., gold.

All *slack*, or *culm*, such as will pass through a half-inch screen, per ton of 28 bushels, 80 lb. per bushel, 40c. gold.

Not otherwise provided for, per ton, 40c. gold.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending Dec. 11.

	1875.		1874.	
	Week.	Year.*	Week.	Year.
Wyoming Region.				
D. and H. Canal Co	55,992	2,893,480	52,031	2,274,797
D. L. and W. RR. Co.	56,186	3,162,376	51,880	2,392,721
Penn. Coal Co	24,446	1,301,836	27,812	1,272,823
L. V. RR. Co	20,998	895,581	18,980	905,341
P. and N. Y. RR. Co.	950	36.571	....	57,596
C. RR. of N. J	43.993	1,411,071	33,719	1,449,896
Penn. Canal	..	297,500	..	321,374
Lack. and B. RR.	..	81,493	..	112 529
	202,565	10,129,928	184,422	8,787,077
Lehigh Region.				
L. V. RR. Co	83,619	2,130,099	58 506	3,059,874
C. RR. of N. J.	29,205	774,158	22,755	1,139.217
D. H. and W. B. RR.	827	78,628	451	40,009
	113,651	2,982,885	81,712	4,239,100
Schuylkill Region.				
P. and R. R. RR. Co.	93,834	4,633,408	82,128	5,171,709
Shamokin & Lykens Val.	20,721	1,171,996	9,516	890,027
	114,555	5,805,404	91,644	6,061,736
Sullivan Region.				
Sul. and Erie RR. Co.	657	12.515	422	32,807
Total	431,428	18,930,712	358,200	19,120,720
Increase	73.228	..	..	..
Decrease	.	190,008	..	..

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about seven per cent. of the whole production.

The following Table does not give the entire production of our Bituminous mines, but it is by far the fullest report published.

The Production of Bituminous Coal for the week ending Dec. 11, was as follows:

Tons of 2,000 lb., except where otherwise designated.

Cumberland Region, Md.	Week.	Tons. Year,	Tons.
Tons of 2,240 lb	33,632		2,226,691
Barclay Region, Pa.			
Barclay RR., tons of 2240 lb	9,229		322,725
Broad Top Region, Pa.			
Huntingdon and Broad Top RR	3,557		203,833
*East Broad Top	635		47,072
Clearfield Region, Pa.			
*Snow Shoe	303		57.495
*Tyrone and Clearfield	8,372		829,770
Allegheny Region, Pa.			
*Pennsylvania RR	1,366		202,246
Pittsburgh Region, Pa.			
*West Penn. RR	1,894		203,736
*Southwest Penn. RR	403		23,502
*Penn. & Westmoreland gas coal, Pa. RR.	4,768		661,566
*Pennsylvania RR	1,959		397,335
Kanawha Region, W. Va.			
†Chesapeake and Ohio RR	5,741		166,517

* To Nov. 30. † Nov. 20.

The Production of Coke for the week ending Nov. 30.

Tons of 2000 lb.	Week. Tons.	Year. Tons.
Tyrone and Clearfield	..	285
Alleghany Region	..	58
West Penn. RR	641	47,225
Southwest Penn. RR	3,672	501,868
Penn. & Westmoreland Region, Penn. RR.	264	33,027
Pittsburgh, Penn. RR	1,200	104,705
Total	5,777	687,168

The receipts at Port Richmond for the week were 30,500 tons, shipments 36,500 tons, and balance on hand 172,000 tons.

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Pennsylvania Railroads amounts to 53,508 tons.

The Receipts at Perth Amboy for the week were 15,373 tons, shipments 7,751 tons, and balance on hand 61,623 tons.

The Exports of Coal from Baltimore for the week were 000 tons, and for the year, 36,548 tons as compared with 66,819 tons to the corresponding time in 1874.

Receipts of Coal at Boston, for week ending Dec. 20, and years from September 1st, 1874 and 1875.

From	Week. Tons.	Previously. 1875. Tons.	1874. Tons.
Alexandria and Georgetown	3,140	39,531	42,452
Philadelphia	16,607	266,261	215,584
Baltimore	2,020	47,086	58,459
Other places	10,484	108,475	91,272
Great Britain	—	704	1,363
Nova Scotia	946	10,922	13 084

Shipments from Pictou, N. S., for the week ending Nov. 27:

	Tons. Week.	Year.
To United States	691	28,121
" West Indies	—	3,971
" South America	—	4,772
" Canada	—	140,878
" Other Provinces	695	66,414
	1,386	244,156

Belvidere Delaware RR. report:	Week.	Year 1875.	Year 1874.
Receipts of coal at Coal Port (Trenton)	4,552	193,455	267,059
" " " South Amboy	13,257	266,727	600,939
Shipments of Coal Port (Trenton)	7,895	192,731	265,910
" South Amboy	8,552	326,956	596,842

Shipments from Block House, Cow Bay, C. B., to the following destinations, from Nov. 8 to Nov. 29, 1875:

	Week.	Year.
Provinces	414	7,774
West Indies	—	1,393
United States	—	11,039
	414	20,206

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Dec. 17, 1875.

Anthracite.

Although the coal trade was pronounced, a week ago, as very dull, yet quite a falling off in business has taken place since. Prices show no improvement, but are fully as irregular as at any time this year. No improvement in business is anticipated before the middle of January. Stocks are quite large, and, at all points excepting Port Richmond, are rapidly increasing.

Combination Meeting.—The representatives of the several anthracite coal interests, were in session, yesterday, at the office of the Delaware & Hudson Canal Co. After several hours of argument, a committee of three was appointed to draw up rules for the government of the Combination during 1876—the committee to report early in January. It is understood that no action was taken relative to curtailing the out-put. There is no doubt expressed of the likelihood of the companies to settle upon an amicable arrangement for the business of 1876.

The Production of anthracite coal for the week ending December 11, was 431,428 tons, and from January 1, 18,930,712 tons. The production of the corresponding week of 1874 was 358,200 tons, and from January 1, 1874, 19,120,720 tons. From the above figures it will be seen

that there was an increase in the production of last week, as compared with the corresponding week of 1874, of 73,228 tons. There has been a decrease since January 1, as compared with the corresponding period of 1874, of 190,008.

Bituminous.

The demand for Bituminous Coal has fallen off very much, as have the shipments. The latter, however, are considerably larger than those of a year ago, and while the Clearfield Region is constantly increasing its excess over last year, the Cumberland Region is diminishing its deficiency. Messrs. BERWIND and WHITE are reported to have made a contract for the delivery of 10,000 tons of their "Eureka" coal; particulars not given. This sale has no connection with their contract with the Pacific Mail Steamship Company, reported by us two weeks ago.

The following is a careful estimate of the stocks of coal at Georgetown and Alexandria:

	Tons.
Borden Mining Company	3000
New Central "	700
Consolidation "	4500
American "	9000
Maryland "	12,000
	29,200

Freights.

Freights are nominally unchanged. The high rates ruling now, are accounted for by a very large number of vessels being weatherbound, and the inability of many vessel-owners to give their vessels the repairs necessary to enable them to sail during rough weather.

Philadelphia Coal Trade.

PHILADELPHIA, DEC. 16, 1875.

At the end of this week and in accordance with a resolution adopted last week, the Schuylkill Region will stop for one month sending coal to market. Although it is claimed that some collieries will continue to work, the stoppage will, probably, be a complete one practically. This action has been made necessary by the enormous accumulation of coal at Port Richmond and in the yards of the company; the result of the high tolls of the Reading Railroad and of the high prices for Schuylkill, when compared to Lehigh, which have caused a marked decrease in the consumption of Schuylkill, and a corresponding increase in the consumption of Lehigh and other coals.

The Lehigh Region will, it is understood, keep at work as long as there is sufficient demand for coal to enable them to do so. The dealers, until the stoppage of the Schuylkill, was determined upon, had exhibited some reluctance to store up, and it is only since that resolution was adopted that they have thought of buying some stock. Their anxiety to do so has been increased, on the intimation from parties well acquainted with the designs of the corporations, that the stoppage might extend beyond one month and, perhaps, until Spring. The action of the Lehigh has made them feel more secure. Vessels are scarce and orders for shipments very few.

Wholesale Prices of Anthracite Coal for Dec. f.o.b. at the Tide Water Shipping Ports per ton of 2240 lb.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
*Lackawanna and Scranton at Rondout and Hoboken	5 05	5 15	5 25	5 65	6 10	4 95
¶Pittston at Newburgh	5 05	5 15	5 25	5 65	6 10	4 95
Wilkesbarre at Port Johnston	5 05	5 15	5 25	5 65	6 10	4 95
Plymouth, R. A., *Net*	....	....	5 25	5 65	6 10	4 95
Susque. Coal Co. at Amboy W.A.	5 05	5 15	5 25	5 65	6 10	4 95
Kingston at Hoboken	5 05	5 15	5 25	5 65	6 10	4 95
Lehigh Coals.						
Old Company at Port Johnston	5 55	....	5 55	5 65	6 10	5 10
Old Company's Room Run "	5 55	....	5 55	5 65	6 10	5 10
§Sugar Loaf, Hobok. & Amb."	5 55	....	5 55	5 65	6 10	5 10
Lehigh Coal Exchange "	5 55	....	5 55	5 65	6 10	5 10
Honey Brook Lehigh	5 55	....	5 55	5 65	6 10	5 10
Spring Mt. C. Co. at Hoboken	....	....	....	....	....	....
Beaver Meadow at South Amboy	5 55	....	5 55	5 65	6 10	5 10
†**Schuylkill Coals at Port Richmond.**						
Schuylkill white ash	4 55	4 65	4 75	5 15	5 60	4 45
Schuylkill red ash	....	....	5 05	5 25	5 65	4 45
Shamokin white and red ash	....	....	....	5 40	5 80	4 50
Lorberry	....	....	5 90	6 90	5 90	4 65
Lykens Valley	....	....	6 50	6 50	6 50	5 50

Per ton.

Freight from Hoboken and Weehawken to New York.... 40c.
" " Elizabethport & Port Johnston to N. York. 45c.
" " South Amboy to New York..... 50c.

*Freight on Lackawanna coal from Rondout to New York, by boats or barges of the D. and H. Canal Co. 50c. per ton, the expense of towing vessels from New York harbor to Rondout and back will be borne by the Company.

†Freight from Port Richmond to New York (free of discharging) 85c. per ton.

‡ Prices to the Trade.

§ By Canal at New York, Jersey City and Brooklyn, 30c additional alongside.

Schuylkill coal is delivered f.o.b. of boats in New York harbor at 50c. per ton additional to these rates.

¶ These rates are nominal.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn. at Greenwich, Philadelphia	$5 20	$6 50
" " at S. Amboy	6 00	6 50
Red Bank Cannel Pa. at Philadelphia	8 00	8 50
" " South Amboy	8 50	....
" Orrel	6 00	6 50
Youghiogheny, Waverly Co., at Balt	5 00	6 50
Despard, West Va.,	5 00	6 50
Murphy Run, West Va., at Baltimore	4 75	6 30
Fairmount, West Va., " "	4 75	6 50
Newburgh Orrel, Md. " "	4 75	6 50
Cannelton Cannel, W. Va., at Richmond.	9 50	11 00
" Splint, " "	5 00	6 50
Peytona Cannel, " "	9 50	11 00
Straitsville " at Sandusky, O	3 25	10 00

Foreign Gas Coals.

	Sterling.	Am. cur'cy,
Newcastle, at Newcastle-on-Tyne	10/6@12/9	6 50@ 7 00
Liverpool House Orrel, at Liverpool	26/	13 00
Ince Hall Cannel "	47/ 18	00@20 00
" Gas Cannel "	32/ 6d	13@14
Scotch Gas Cannel, at Glasgow, nominal,	25/	7 50
	Gold.	
Block House, at Cow Bay, N. S	2 00	5 50
Caledonia, at Port Caledonia	1 75	5 25
Glace Bay, at Glace Bay	1 80	5 50
Lingan, at Lingan Bay	1 75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion & Vale mines, at Pictou.	2 25	5 75

Steam and House Coals.

Broad Top, at the mine, $1 25; at Amboy	4 75@5 00	5 25@5 50
Cumberland, at Georgetown and Alexandria, Va	4 00@4 25	5 25@5 50
Cumberland, at Baltimore	4 25@4 35	5 75@6 00
Clearfield and Allegheny, "Kittanning," "Sterling," "Sonman," and "Eureka," at the mines, 90; at Greenwich, Phil.	4 25	5 65

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove.	Chestnut.
Pittston coal, in yard	$6 20	$6 40	$5 60
Lackawanna coal, delivered	6 75	7 00	6 25
Wilkes-Barre, "	7 00	7 25	6 75
Lehigh & Locust Mountain, del'd	7 00	7 50	6 50
Schuylkill Red Ash, del'd	7 00	7 50	

The Cost of delivering Pittston coal ranges from 40 cts. to $1 per ton, according to distance from the yard.

Williamsburgh, N. Y.
Lackawanna Coal at Yard.

Stove	$6 40
Egg	5 90
Chestnut	5 40

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb					$23 00
Liverpool House Cannel	"	"	"	"	25 00
American "	"	"	"	"	16 00
American Orrel	"	"	"	"	11 00
Red Bank Cannel	"	"	"	"	14 00
Cumberland	"	"	"	"	7 00

Baltimore, Md. Dec. 14, 1875.

Reported by our Special Correspondent.

ANTHRACITE.

Wholesale or Trade Prices per 2240 lb.

Wilkes-Barre "Lee" or "Diamond," Pittston and Plymouth. White ash.	In cars at depot.	By boats afloat.
Lump and steamboat	$4 80	$4 65
Broken	5 55	5 40
Egg	5 92	5 77
Stove	6 17	6 02
Nut	4 97	5 10
Shamokin, (red or white ash), and "Boston," freeburning white ash,		
Egg	5 95	5 79
Stove	6 15	5 99
Lykens Valley, red ash,		
All sizes	6 55	6 37

From wharf or yard, wholesale, 50@75c. additional.
By retail, all kinds and sizes, per 2240 lb. $7 00@8 00.

BITUMINOUS.

George's Creek and Cumberland f. o. b. at Locust Point	4 15 4 50
West Virginia f. o. b. at Locust Point	5 50
Youghiogheny Gas, f. o. b. at Locust Point	5 50
Swanton Coal, George's Creek	4 40

Boston. Dec. 14, 1875.

Reported by our Special Correspondent.

CARGO PRICES TO TRADE.

Lingan coal	$ 5 20	Westmoreland and Penn.	6 85
Caledonia	5 00	Waverly Co. Youghiogh'y.	6 80
Pictou	5 60	Cannelton Cannel	11 60
Block House	5 20	Cumberland	5 80@ 6 00
Red Bank Cannel	9 00	Anthracite	6 50@ 7 25
Glace Bay	5 00	" retail	7 50@ 8 00
Sydney	6 25		

Buffalo, N. Y. Dec. 14, 1875.

Reported by our Special Correspondent.

ANTHRACITE.

	Afloat f.o.b.	Retail. Deliv'd.
Grate	$6 40	$7 40
Egg	6 40	7 40
Stove	6 85	7 85
Nut	6 60	7 60

	Lump.	Run of Mine.	Nut.	Slack.	Nut & Slack.
Connellsville Coke	$5 50	....	....	....	....
Brookfield Coal	....	....	....	....	....
Briar Hill	4 50	....	....	....	3 00
Youghiogheny	4 75	....	....	....	....
Monterey	3 75	3 50	3 25	2 50	....
Catfish	3 75	3 50	3 25	2 50	....
Stoneboro	....	....	3 25	2 50	....
Sterling Cannel	5 50	....	....	....	....
Buffalo Coal Co	3 50	3 25	....	2 30	....
Cameron	....	3 25	....	....	....

Chicago, Ill. Dec. 14, 1875.

Specially reported by Messrs. RENO & LITTLE, Coal Merchants.
Retail prices per ton of 2000 lb. delivered to buyer.

No change in prices of coal. Trade very quiet.

		BITUMINOUS.	
Lehigh Lump	$10 50	Briar Hill and Erie	@ 7 00
Lehigh grate and egg	10 50	Walnut Hill, Pa	@ 6 50
Lehigh stove and chest	11 00	Midway, Pa	@ 6 50
Lackawanna, Wilkes Barre and Pittston*		Cannel	@ 8 00
Grate and egg	9 50	Blossburg	7 50
Stove and chestnut	10 00	Indiana Block	6 00
		Hocking "Brooks"	6 50
		Wilmington and Illinois	5 00

* 50 cents off these prices for car load lots to country dealers and manufacturers.

Cincinnati, O. Dec. 14, 1875.

Reported by our Special Correspondents.

Per ton of 2000 lb.	Bush.	Ton
Youghiogheny, or Pittsburgh, afloat	10 c.	——
Pomeroy coal	8 c.	——
Kanawha "	10 c.	——
Cannel coal, according to quality	—	——
Semi-Cannel	—	——
The following are the retail prices delivered		
Youghiogheny	15@16c.	$4 00
Pomeroy	11c.	3 00
Cannel	—c.	....
Kanawha Semi-Cannel	13c.	3 60
Anthracite	9 50@10 50	
Foundry coke	10c.	——
Coke, hard and soft	1cc.	....

Cleveland, O. Dec. 14, 1875.

Specially reported by Messrs. WARNER, BATES & CO.

WHOLESALE.

Per ton of 2000 lb. f. o. b. vessels.

	For vessels.	On cars.
Youghiogheny Gas Coal	$4 40	$4 15
Cannel	4 50	4 15
Blossburgh	5 00	5 00
Briar Hill Block Coal	3 80	3 60
Hocking Valley	3 25	3 10
Straitsville Coal Co., lower vein	3 25	3 10
Massillon	3 10	3 30
Tuscarawas Valley	2 85	2 70
Columbiana	2 80	2 60

RETAIL DELIVERED.

	Lump.	Nut.
Briar Hill	$5 00	$3 50
Massillon	4 50	4 00
Mineral Ridge	4 50	4 00
Columbiana	3 25	3 00
Straitsville Coal Co., lower vein,	4 00	3 00
Tuscarawas Valley	3 25	3 00

ANTHRACITE DELIVERED.

	Grate.	Egg.	Stove.	Chestnut.
Lehigh	$9 00	$9 00	$9 50	$9 25
Wilkes-Barre	8 10	8 10	8 50	8 25
Lackawanna	8 10	8 10	8 50	8 25

Detroit, Mich. Dec. 14, 1875.

Specially reported by Messrs. ROBINSON & KEYS, Dealers in all kinds of coal.

Per ton of 2000 lb.

Lehigh Lump, per ton	$10 50	Blossburg	8 50
Lehigh " prep.sizes.	10 00	Briar Hill	7 50
Wilkes-Barre, Grate and Egg	9 00	Willow Bank	7 00
Wilkes-Barre, Stove and Nut	9 50	Erie	30
		Massillon	7 00

Erie, Pa. Dec. 14, 1875.

Reported by our Special Correspondent.

Wholesale, per ton of 2000 lb.	Bituminous f. o. b.		
Briar Hill lump	$3 75	Beaver lump	$3 50
Midway	3 25	Cat Fish	3 00

Indianapolis, Ind. Dec. 14, 1875.

Specially reported by Messrs. COBB & BRANHAM

We quote coal in our market as follows:

Wholesale on board cars, and retail delivered to consumers.
Per ton of 2000 lb., bushel of 70 lb.

BITUMINOUS.

Indian Creek, per ton	$2 75	Peytona cannel, per ton.	7 00
White River, "	2 75	Indiana Cannel	6 50
Brazil Block, "	2 90	Hocking Valley	4 25
Highland, grate, "	2 50	Youghiogheny	4 75
Block coal, nut, per car	18 00	Blossburg (smithing)	6 50
Highland " "	18 00	Piedmont "	6 50
Block Slack "	17 00	Gas coke, per bushel	10

ANTHRACITE (Lackawanna and Wilkes-Barre.)

Broken	$8 70	Nut	8 75
Egg	8 70	Stove	9 00

Lehigh Anthracite.

Broken	10 35	Nut	10 35
Egg	10 35	Stove	10 60

Retail, per bushel, delivered.

Sand Creek	16c.	Block Nut, steam	9
White River	14	" Slack, "	8
Brazil Block	15	Peytona Cannel	28
Highland grate	13	Virginia "	27
Block Nut, domestic use	12	Youghiogheny	22
Highland Nut, " "	12	Blossburg	26
" " steam	9	Piedmont	26

GAS COKE (measured.)

Crushed	15c.	Lump	12c.

ANTHRACITE.

Wilkes-Barre and Lackawanna (all sizes)	$9 75 per ton.
Lehigh, retail	$11 50 per ton,

Louisville, Ky. Dec. 14, 1875.

Specially reported by Messrs. BYRNE & SPEED.

WHOLESALE.

	per bushel		per bushel
Pittsburgh	10c	Pine Hill	—
Raymond City	9c.	Kentucky	—

RETAIL.

	per bushel		per bushel
Pittsburgh	14c.	Peytona Cannel	20@22c.
Raymond City	13c.	Buckeye "	—
Pine Hill	13c.	City-made Coke	11c.
Kentucky	12c.	Anth., per ton,	$10 00 to 10 50
Screened Pittsburgh per load			$3 00
Screened Raymond City			2 75
Pine Hill (Kentucky)			2 75
Cannel			$5 to 5 50

Milwaukee, Wis. Dec. 14, 1875.

Specially reported by Messrs. R. P. ELMORE & Co.

Retail price per ton of 2000 lb.

Lehigh Lump	$10 00	Briar Hill, select	$8 00
Lehigh Prepared	11 00	Blossburgh	8 00
Lackawanna (all sizes)	10 00	Cannel	8 00
Pittston	10 00	Pittsburgh	7 00
Scranton	10 00	Steam coal	5 00

New Orleans, La. Dec. 12, 1875.

Specially reported by Messrs. P. & R. DE VERGES, Wholesale and Retail Dealers in Pittsburgh, Anthracite, Cannel and other Coals.

Pittsburgh coal, retail, per bbl	60c.
" wholesale	35c.
" steamboats, per box	50c.
" to manufacturers, per bbl	55c.
" shipments, per hhd	$6 00
Anthracite, wholesale, per ton	9 50
" retail, "	12 50
Virginia Cannel, per bbl	80c.
Scotch " "	
Mt. Carbon, wholesale, per bbl	
" " retail, "	
St. Bernard, wholesale, per bbl	
" retail, "	

Pittsburgh, Pa. Dec. 15, 1875.

COAL.—The shipments of coal by river during the past week were light, and they are likely to be small for some time to come, as the indications at this writing are favorable to a suspension of navigation. However, operators generally would like to have shipments suspended, as the down river markets are all glutted, and there is no chance to get prices up to afford a fair margin for profit until stocks are considerably reduced; some of the markets in question have stock enough afloat and in yard to supply them during the entire Winter, while the stock in first hands hereabouts is reduced lower than it has been for several years. The general position of the market at the present writing is favorable to operators, but as in all other branches of business, the margin for profit is small. The miners who were out on a strike have pretty generally resumed work, and the indications are that the most of them will have steady employment all Winter.—*American Manufacturer.*

Richmond, Va. Dec. 12, 1875.

Specially reported by S. H. HAWES, Dealer in Coal.

Per ton of 2240 lb., f.o.b.

Kanawha Cannel	$12 00	New River Bituminous	$4 50
" semi-Cannel	4 75	Clover Hill Coal	4 25
Coalburgh Splint	4 75	James River Bitum	3 30
Lewiston "	4 75	" " Carbonite	5 80
Kanawha Gas coal	4 50		

San Francisco, Cal.

From the *Commercial Herald*, Dec. 2, 1875.

Imports from January 1st to Nov. 30:

Anthracite tons	12,286	English, tons	45,637
Australian, tons	125,133	Vancouver Island, tons	55,407
Coos Bay, tons	29,937	Rocky Mountain, tons	53
Cumberland, tons	10,228	Seattle, tons	57,511
Mt. Diablo, tons (10 mos)	121,059	Bellingham Bay, tons	10,945

The market continues to be liberally supplied with all descriptions saving anthracite, particularly Lehigh, the latter yet scarce and high. Imports for the week embrace the following cargoes: *Southern Cross* and *Voyager*, from New York, 700 tons; Br. ship *Cairo*, 2002 tons, Newcastle, N. S. W.; *Enoch Talbot*, 1750 tons Seattle; *Remijio*, from Departure Bay, 820 tons Wellington; *Lapwing*, from Glasgow, 880 tons Scotch; *Tintern Abbey*, 1730 tons Newcastle, N. S. W.; *Bonanza*, from Baltimore, with 1372 tons and 500 casks Cumberland. In addition to the above daily supplies reach us from Mt. Diablo, Coos Bay, Bellingham Bay, and other Pacific Coast mines. The market is still sluggish for all bituminous. Wallsend cargoes may now be quoted at $9@9 25; Sydney, $8 25@8 50; Cumberland in bulk, $14@15; casks, $16@18; Bellingham Bay at $8 50; Coos Bay, $10; California Mt. Diablo Steam, $6 25@8 25 for fine and coarse respectively; English and Scotch Steam, $9@10; Nanaimo, $9 50@$10; Seattle, $9 25@1$0; Anthracite, $15@$18.

Toledo, Ohio. Dec. 14, 1875.

Specially reported by Messrs. GOSLINE & BARBOUR.

Per ton of 2000 lb. on cars.

Hocking Valley	$3 40	Massillon	4 00
Straitsville	3 40	Youghiogheny	5 00
Shawnee	3 40	Blossburg	7 00@7 50
" nut	2 90	Cumberland	7 00@7 50
Briar Hill	5 50	Connellsville coke	7 00

ANTHRACITE.

Grate, screened	$7 50	Stove, screened	$7 75
Egg, "	7 50	Chestnut "	7 50
Lehigh Lump	9 00		

40 cents to $1 per ton additional for delivery at retail.

Toronto, Ont. Dec. 11, 1875.

The following are present retail prices for coal: Per ton all sizes.

Lackawanna and Scranton	$7 00
Lehigh Lump and prepared	8 00
Blossburgh	6 50
Soft lump for grates	6 00
Soft nut	4 50

Halifax, N. S. Dec. 11, 1875.

Prices per ton of 2240 lb. in gold.

Sydney (old mines)	$4 00	Little Glace Bay	3 35
Gowrie	3 35	Blockhouse	3 35
Victoria	——	Albion (at Railroad)	4 00

Montreal. Dec. 11, 1875.

Specially reported by Messrs. ROBERT C. ADAMS & Co.

Wholesale per ton of 2240 lb.

Scotch Steam	$6 00	Cape Breton Steam	$5 25
Pictou "	5 75	Newcastle Smiths	7 00

Anthracite at retail, per 2000 lb., delivered.

Egg	$8 50	Chestnut	8 25
Stove	9 00		

Rates of Transportation on Anthracite Coal to Tide Ports.

Lehigh and Wyoming Coals. per ton of 2240 lb	From Penn Haven.	From Mauch Chunk.	From Hazleton**	From Upper Lehigh.	From Ashley and Sugar Notch.
To ‡ Newark, N. J., via Central Railroad of New Jersey	2 60	2 46	2 93	2 93	3 16
‡ Mauch Chunk, Pa., via Central Railroad of N. J	14	..	56	47	71
‡ Philipsburg, N. J	99	85	1 32	1 32	1 65
Elizabethp't, Port Johnston, Hoboken and South Amboy, N. J., shipping and wharfage 35c. add.	2 24	2 10	2 59	2 57	2 80
High Bridge, N. J	2 40	1 95	2 80	2 54	2 72
Somerville and Raritan, N. J	2 80	2 35	3 20	2 35	3 12
Elizabeth, Cranford, Westfield & Elizabethport, for consumption,	2 60	2 46	2 95	2 93	3 16
¶ Jersey City, N. J., and New York, via L. V. RR. and Morris Canal	2 85	2 40	3 17	3 24	3 54
Andover, via Delaware, Lackawanna and Western RR	3 30	3 10	3 70	3 69	3 99
Trenton, Somerset Junction and Greensburg, via P. RR. Belvidere Division	2 65	2 45	3 05	3 04	3 34
Trenton, for shipment, including shipping and wharfage	2 11	1 95	2 45	2 46	2 76

From *Mauch Chunk* to *New York* (towing limits) and Jersey City† via Lehigh Valley RR. and Morris Canal... $2 37

From *Mauch Chunk* to *Philadelphia* via L. V. RR. and North Penn. RR 1 75

††From *Phillipsburg, N. J.* to *Hoboken* for shipment via Delaware. Lackawanna and Western RR., Morris and Essex Division 1 24

From *Lackawanna Junction* to **Auburn, N. Y.*, for shipment, via Southern Central R.R. in connection with Pa. and N. Y. R.R. 2 53

From *Lackawanna Junction* to ‖*Weedsport* for *Rochester and Charlotte* 2 59

From *Lackawanna Junction* to *Sterling* for *Oswego, N. Y.*. 2 62

‖ To this point for all places between Rochester and Buffalo the rate is 2 53

* The rate to this point for Syracuse is 2 00

** Rates on line coal from Hazleton are 10c. per ton above these figures.

‡ The cost of unloading is to be added to these rates. No charge less than 40c. per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be $1 15 per ton.

§ Twenty cents per ton less when five cars at a time to one party. Provided that where the reduction makes the rate $1 a ton, or less, the rate will be $1.

¶ 20 cents per ton additional for transferring coal from boat to boat, and 30 cents per ton for reshipment of same from wharves.

† Transportation on Coal destined for re-shipment from this point is 20c. less than above rate.

†† The rate for consumption to this point is $1 80.

Schuylkill Coals. per ton of 2240 lb.	From Pine Grove	From Tamaqua.	From Port Carbon.	From Mount Carbon.	From Schuylkill Haven.
To *Port Richmond*, for shipment, via P. & R. R. R., Main Line	2 12	2 07	2 00	1 99	1 92
Philadelphia, Retail yards	2 22	2 17	2 10	2 09	2 02
Harrisburg, via Lebanon Valley Branch	1 35	2 02	1 95	1 94	1 87
Allentown, via East Pennsylvania Branch	1 70	1 65	1 58	1 57	1 50
Lancaster, and Points on Lancaster Branch, via R. & C. R.R	1 82	1 77	1 70	1 69	1 62
Dauphin, via Schuylkill and Susquehanna Branch	85	....	1 43	1 42	1 35
Slatedale Junction via Berks and Lehigh Branch	1 88	1 83	1 76	1 75	1 68
Lebanon, via Lebanon and Tremont Branch	96	....	....	....	....

From *Tamanend* to *Catawissa*, via Catawissa and Williamsport Branch Railroad 94

From *Tamanend* to *Williamsport*, via Catawissa and Williamsport Branch Railroad 1 39

* From *Port Clinton* to *Philadelphia* via Schuylkill Canal, including freight and charges for the use of cars and barges, and for tolls (exclusive of cost of unloading) ... 1 69

* From *Port Clinton* to *New York*, within towing limits, " 53d street 2 71

For shipment via Main Road or Schuylkill Canal, one and one-half cents per ton per mile, and two cents per ton additional, to Port Carbon, Mount Carbon, Schuylkill Haven, Pine Grove, Tamaqua, or Port Clinton, for Canal, as the case may be.

Coal sent to points on the Catawissa and Williamsport Branch will be charged one and one-half cent per ton per mile, and two cents per ton additional to Tamanend.

The rates of freight and tolls on lump and steamboat coal (except that sent to Richmond for shipment) will be twenty per cent., and on broken coal will be ten per cent. less than the above rates.

* The charge from Schuylkill Haven to Philadelphia or New York is 11c. additional to these rates.

On and after July 5th, the Drawback of ten cents per ton now paid on shipments of Anthracite Coal from Schuylkill Haven and Port Clinton, that have passed Fairmount Locks to Philadelphia and vicinity, will be discontinued.

CANAL TOLLS, exclusive of towage, Bordentown to New Brunswick, when towed by the Company's Steam Tugs:

For Anthracite Coal ..... 55c.

Bituminous and Semi-bituminous Coal.. 35c.

Freights.

Per ton of 2240 lb.

Representing the latest actual charters up to Dec. 16, 1875.

PORTS.	From Philadelphia.	From Baltimore.	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.¶
Augusta, Me	....	2 40	....	....
Albany	*85	1 70	...	....
Amesbury, Mass	....	....	....	....
Bangor, Me	†2 00	3 00	....	2 10
Bath, Me	1 60	2 75	2 90	1 30
Baltimore	....	....	....	....
Boston, Mass	§2 00	2 40@2 50	2 70	1 90@$2
Bridgeport, Ct	*85	1 65	2 00	90
Bristol, R. I	....	....	2 00	90
Cambridgeport, Mass.	§1 90	....	2 70	1 60
Derby	....	1 65	....	....
Dighton	....	1 70	....	....
East Cambridge	1 90§	....	2 75	§1 55
Fall River	1 50	1 70	....	90
Hackensack	....	....	....	....
Hallowell, Me	....	....	....	....
Hartford	....	1 65	....	....
Hoboken	†85	1 40	1 60	40
Hudson	....	1 65	....	....
Jersey City	....	1 40	1 60	40
Lynn, Mass	†2 10	....	....	†2 05
Middletown	....	....	....	1 15
Mystic	....	....	....	....
Newark	....	....	....	....
New Bedford	1 50	1 70	2 10	90
Newburyport	2 10	2 65	2 75	1 75
New Haven	*85	1 70	2 00	90
New London	1 50	1 70	2 00	95
Newport	1 50	1 65	2 00	90
New York	85††	‖1 65	1 70	40
Norfolk, Va	85	60	60	....
Norwalk	85‡	1 50	2 00	8‹
Norwich	1 50‡	1 70	....	90
Pawtucket	1 75‡	1 65	2 10	....
Philadelphia	....	80	....	....
Portland	1 95	2 50	2 70	1 60
Portsmouth, N. H.	2 05@2 10	2 65	2 90	2 10
Providence	1 50	1 70	2 00	90
Petersburg, Va	....	90	....	....
Portsmouth, Va	....	....	....	....
Poughkeepsie, N. Y.	....	1 50	....	....
Richmond, Va	1 00	70	....	....
Rockport	....	....	....	....
Saco	2 50	....	....	....
Sag Harbor	....	....	....	1 00
Salem, Mass	2 00	2 50	2 80	2 05
Salisbury Pt., Mass	....	....	....	...
Savannah, Ga	....	1 50	....	....
Stamford	*85	....	....	90
Stonington	....	....	....	....
Taunton	.. .	..	....	....
Trenton, N. J	....	....	....	....
Troy	...	....	....	....
Warren, R. I	....	....	....	90
Washington, D. C	1 00	....	....	....
Wareham	....	1 75	2 10	....
Weymouth	2 00	2 25	2 75	....
Wilmington, Del	....	85	....	....
Wilmington, N. C	....	1 50	....	....

* And discharging and towing. † And discharging.

‡ And towing. § 3c. per bridge extra.

‖ The rate to this point by barge is $1 70. †† Afloat.

From Philadelphia to all places on the Hudson River the rate is 85c., and discharging and towage according to destination.

¶ These rates are very irregular and our quotations may be considered nominal.

BELGIAN IRON AND COAL TRADES.

Specially reported by E. MÜLLER & Co.

ANTWERP, Nov. 29, 1875.

Since our last we have no improvement to note in the position of our iron market. No transaction of any importance has taken place within the last ten days, nor is there any, to our knowledge, in view. Although prices have firmed up in England, for pig iron, it has not been so on our side, forge iron being still offered at 6.50 fs., and foundry at fs. 8. Indeed, for our part, we look for a further fall, ere long, in the prices of the raw materials, which would modify, to a certain extent, the present condition of our large works, the principal complaint of many of which being not so much want of work as the unremunerative prices at which it has to be undertaken.

We quote to-day:

Bars,	ordinary	fs.	16.00
Angles,	"	"	16 75
Nail Rods,	"	"	16.00
Hoops,	"	"	16.75
Nail Sheets,	"	"	19.00
Rails,	"	"	16 50
"	Bessemer	"	23.00
Girders,		"	17.50 to fs. 23

per 100 kilogrammes.

In coals but very little is doing, and though screened and lumps have been a shade more in demand, coke and rolling mill qualities have, on the contrary, been more or less a drug.

Quotations are as follows:

Small	fs.	14.00	to fs.	15 00
Unscreened	"	16.50	" "	17.50
House	"	19.50	" "	20.50
Screened	"	30.50	" "	31.50
Lumps	"	32.00	" "	33.00

Robert Crooks & Co.'s Metal Report.

LIVERPOOL, December 2, 1875.

PIG IRON.—The fluctuations in the Warrant Ma ket during November have not been very extensive. Early in the month, price dropped from 62/4½d to 60/ 3d., from which figure a steady advance has since taken place, and business has been done during the past week at prices ranging from 61/6d to 62/ 7½d., closing yesterday with sellers at the latter, and buyers at 62/ 6d. Stocks are being gradually reduced, being, on the 26th ult., 66,294 tons, against, say, 71,885 tons at the end of October. The number of furnaces in blast now is 114. Makers' Iron is firm, but prices are not much changed. No. 1 Gartsherrie, 73/; Coltsness, 77/ 6d; Summerlee, 70/; Monkland, 64/ f.o b Glasgow; Glengarnock, 69/; Eglinton, 63/ 6d f.o.b Ardrossan. Shipments for week ending 27th November were 8,116 tons. For this year the increase over last is 83,727 tons.

FINISHED IRON.—The market has been very dull during the past month, and the mills but very barely supplied with orders. Owing to cost of production not having lessened, makers have maintained their prices with firmness, and we cannot consider the market as having dropped more than 2/ 6d per ton for Bars, whilst the price for Sheets and Hoops has, if anything, stiffened.

TIN PLATES.—The market was, at the commencement of the last month, very depressed, and this feeling intensified, no alleviating symptoms showing. Under these circumstances there are, of course, lower quotations; but a very large number of makers will not take current rates, and prefer reducing their turn-out to running further at a loss. In addition, orders are now arriving more freely from United States for spring shipshipment, and this also has helped to clear off the specially cheap lots offered of late. Present prices are—Charcoal Tins, R.G., 26/ 6d; Monnow, 25/ 6d; Fleur de Lys, 25/; Siluria, 24/ 6d; Charcoal Ternes, R G,, 23/ 6d; S.T.P., Allaway, 22/ 3d; Dean, 22/; Coke Tins Diamond Y, 20/ 6d; Asyami, Cwmdu, Deri, Flint, Rhine, 218; Terns, 1/ to 1/ 6d less.

COPPER.—No change to report, this article having been steady for some time past at the figures noted above.

TIN.—We have to note a slow sale during the past four weeks, with a drop of £3 per ton as a result.

LEAD, after falling in value from 5/ to 7/ 6d per ton, is again stiffer, owing to the limited nature of our late supplies.

FREIGHTS to Canada will next week be very low for this season of the year, owing to the amount of opposition now on the berth. Rates will be:—To New York, 12/ 6d; Boston, 7/ 6d; Philadelphia, 12/ 6d; Baltimore, 10/; Montreal, 25/; Quebec, 25/; Toronto, 27/ 6d; Hamilton, 27/ 6d.

EXPORTS FROM LIVERPOOL TO—

DESCRIPTION.	NEW YORK. Nov. 1875.	NEW YORK. Nov. 1874.	BOSTON. Nov. 1875.	BOSTON. Nov. 1874.
Sheets, Bars, Plates, &c...	173	242	230	447
Railway Iron	—	9	—	280
Pig Iron.....	—	—	10	5
Chain	63	111	--	—
Wire	156	45	192	103
Copper	—	—	20	—
Tin and Terne Plates.....	36,975	43,788	17,731	9,824

DESCRIPTION.	PHILA. Nov. 1875.	PHILA. Nov. 1874.	BALTIMORE. Nov. 1875.	BALTIMORE. Nov. 1874.
Sheets, Bars, Plates, &c.	20	30	—	—Tons
Railway Iron..	—	—	—	— "
Pig Iron	230	20	—	— "
Chain	18	21	6	70 "
Wire.....	12	—	—	— "
Copper.....	—	—	—	— "
Tin and Terne Plates....	26,642	13,533	8,665	8,662Bxs

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, Dec. 17, 1875.

American Pig.—There is no improvement in the demand for pig iron, and prices have a downward inclination. The weakness is greater, from the fact of certain stocks of pig iron being in the hands of Sheriffs, and that additional furnaces are going into blast, which will increase the already large stocks. There are many furnace companies producing irons which, although they may be of good quality, have not secured a reputation, and to sell them concessions have to be made from the market rates. Unfortunately, these makers are so situated, financially, that they are compelled to take what they can get, and in their efforts to sell, most buyers become familiar with their quotations, and use them as a means of breaking the prices of standard irons. We hear of several sales below our quotations. Lower prices are anticipated before the end of January. We note sales for the week of 100 tons of No. 2 foundry, Port Orem, at a private price, but below $21; 1500 tons of No. 1 Thomas at $23; 300 tons of No. 2 Thomas at $21; and about 500 tons of other brands on the basis of about $23 for No. 1 foundry. We quote No. 1, $23; No. 2, $21; and forge $15@20.

Scotch Pig.—There is but a very light demand for this article, but prices are very firm owing to the steady market in Glasgow; small importations; and stocks in this market being held by strong hands. There is but little iron coming on consignment, which also adds to the strength of prices here. We note sales of 100 tons of Glengarnock and 150 tons of Coltness on private terms. We quote Eglinton at $29 50@30; Coltness, $33; Glengarnock, $31; and Gartsherrie, $32 50

Mail advices bearing date of Glasgow, Dec. 3, quote Warrants at 62/ 6d., and say that stocks in CONNAL & Co.'s stores were reduced during the week 1010 tons, leaving the total quantity at 65,284 tons. The shipments during the week ended Nov. 27, were 345 tons less than for the corresponding week of 1874. Quotations for No 1 iron were as follows: Gartsherrie, 72/ 6d.; Coltness, 77/; Summerlee, 70/; Langloan, 73/; Glengarnock, 68/ 6d.; and Eglinton, 63/.

Rails.—We are reported several sales of steel rails for next year's delivery, aggregating about 20,000 tons, particulars not given. There are inquiries, likely to result in business, for about 10,000 tons additional. In iron rails we learn of no transactions. We quote iron at mills, at $43@48; and steel at $65@70.

Old Rails.—We note a sale of 160 tons at $22 50 here. As the previous sale was made at the same figure, we are compelled to give this price as the general market quotation, although we are aware that some hold at $25, and others are entirely out of the market.

Scrap.—We have no transactions to note in this article, and quote nominally at $30@31.

Exports from New York for the Eleven Months Ended Nov. 30.—Among other items of the exports of domestic products and manufactures appear the following: Pig iron, 8464 cwt., $13,970; bar iron, 2340 cwt., $7,732; railroad bars, 6,560 cwt., $15,727; castings, $186, 358; 5,996 car wheels, $82,084; stoves and parts of, $34,759; 27 locomotives, $360 018; 30 stationary engines, $34,327; boilers, $73,842; machinery not elsewhere specified, $1,992,662; nails and spikes, 3,249,846 lb., $123,287; all other manufactories of iron, $1,974, 913; steel ingots, bars, sheets and wire, 14,470 lb., $1,341; cutlery, $18,757; edge tools, $568,047; files and saws, $16,417; muskets, pistols, rifles and sporting guns, $2,701, 478; manufactures of steel not elsewhere specified, $138,800; shot and shell, 18,353 lb., $1,836; printing presses and type, $93,872; sewing machines and parts of, $1,335,059. Among other exports during Nov. were about 50 tons of pig iron to Nova Scotia and a small lot to Mexico; about five tons of bars to U. S. of Columbia; and three locomotives to Peru and two to Cuba.

Philadelphia, Pa.

Weekly report of the Philadelphia Iron Market, furnished by Messrs. JUSTICE COX & Co., Iron Merchants, 333 Walnut street, Philadelphia. Week ending Dec. 16, 1875.

The market is slightly weaker than at our last. Some small companies are disposed to shade prices for cash, this producing an unsteady feeling and a desire among buyers to hold off and see what the new year will bring forth, and whether the large and strong companies are firm at quoted prices and are actually refusing to sell for next year's delivery. We hear of some large sales of Roberts' iron, and if quoted prices are correct, they should have no trouble in placing their whole production at the price. We are informed that the personal property, including pig iron on hand, of Topton Iron Company and Hamburg Iron Company, are in the hands of the Sheriff. The low prices now ruling will give the Sheriff work in other localities. If some firmness among furnacemen, were brought about, prices would considerably advance as the stocks on furnace-banks are smaller than for years. We quote No. 1, $24@23; No. 2, $22; gray forge, $20@22.

Bar Iron is quoted at 2½c. and dull of sale.

Iron Rails.—We hear of no sales and quote nominally at $45@50.

Old Rails.—We quote $22 50@25.

Scrap.—Cast, $19@20; wrought, $28@30.

Baltimore. Dec. 15, 1875.

Specially reported by Messrs. R. C. HOFFMAN & Co.

Transactions in iron for the past week have been very light, with every prospect of their continuing so until after the holidays. We note no change in prices, and quote:

Baltimore Charcoal....	$32@35	Anthracite No. 3.....	$21@22
Virginia Charcoal.....	30@34	Mottled and White....	18@19
Anthracite No. 1.....	25@26	Charcoal C. B. Blooms,	72@75
" No. 2.....	23@24	Refined Blooms.....	60@65

Boston. Dec. 11, 1875

Specially reported by E. P. CUTLER & Co.

Since our last we have to report sales of about 1600 tons of pig iron, it being lots that were pledged some time ago. The price obtained was low, even for the *dull* market; the local demand is small.

PIG has had a very dull week. The offers from New York on choice and fancy brands No. 1 fluctuate from $22 50 to $23 25 a ton, f. o. b., while less prominent makes are quoting down to $22. This has still further tended to break up our market and turn buyers into the most disconsolate and dilatory moods. The stock on wharf here is still ample, though the receipts are very light. There is no change in the quotations brokers and dealers here make, the inside figures representing the more immediate figures at which sales f. o. b., are to be made. No. 1, $24@$26; No. 2, $22@$24; gray forge, $19@$21.

The rumor current that a heavy lot of hypothecated iron was likely to be closed out, proved to be a fact late Friday night. The iron all goes into consumption. It sold at a very low figure, which was necessary in order to meet New York and Philadelphia quotations.

BAR lost its lethargy on Monday morning, when a leading house openly announced guaranteed refined iron at $52 50, 2240 lb. to the ton. For a week or so past there have been rumors of an irregularity in prices, but traceable to no head. Therefore, when this $2 50 a ton let down was made, the surprise was intense. The stocks offering at these quotations are not light nor broken. They have attracted buyers from every part of New England and possibly no week for a year has been more active, considering the amount of iron jobbed. This value is a trifle less than 2½c. currency per pound; that exact quotation would be $53 20 a ton. Considering gold at 115, the present currency price being $52 50, the gold rate would be $44 62. At 2c. a pound the ton would cost $44 80. We make these comparisons that the reader may intelligently understand just how low our market has gone. Very few of our jobbers recall prices even before the war at 2c. a pound, and scarcely a carriage maker or blacksmith has bought lower than 2½c. refined iron. The boast of England has been that her iron has, in times past, sold at a penny sterling a pound; ours is likely to be yet as good, that is, if the competition continues. This circumstance re-emphasizes what has been said previously of pig. Boston is probably the lowest priced iron market in the country. In common iron there have been sales of 50 tons at $50; but even this now is comparitively an extravagant price.

STEEL is having a fair business. An effort was made to break the market on machinery by quoting Atlantic 8c., but this brand is being closed out, the choice of sizes gone; and so, not representing an average assortment, the effort failed of success. There is a little more doing in tool steel, and a small inquiry for boiler plates again.

We quote American tool, 14@15c.; American Machinery, 9@9½c.; Bessemer tires, 6¾@7¼c.; SWEET'S Excelsior Tire, 8½@12c.; English tool, 16@18c., gold.

SCRAP IRON is, if anything, a trifle easier for wrought. The Weymouth areabout the only buyers now of prominence in the market, and they still refuse to pay over $1 35 delivered. The purpose of the Rhode Island horse-shoe people to put in furnaces for gray forge is discussed through the trade, and is likely to have much more effect on the New York and Providence scrap heaps than on those elsewhere. In light iron the Bridgewater have made a reduction of ½c., declining to pay over ½c. f. o. b. There are, however, dealers here who decline to sell for less than 1¼c., and two who have accumulated heaps of over 75 tons each, for which they anticipate in March securing 1½c. prompt cash out of store.—*Commercial Bulletin.*

Cincinnati. Dec. 14, 1875.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

No change in prices.

Chicago. Dec. 14, 1875.

Specially reported by Messrs. ROGERS & Co., dealers in Scotch and American pig iron.

No change in prices.

Cleveland, Ohio, Dec. 14, 1875.

Messrs. C. E. BINGHAM & Co., quote as follows:

Per gross ton, on four month's time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.	
No. 1, Lake Superior Charcoal	29 50@....
No. 2, "	29 00@....
No. 1, Anthracite.....	26 50@....
No 2, "	25 00@....
No. 1, Bituminous foundry.....	26 50@ ...
No. 2, " "	25 00@....
American Scotch, No. 1, Cherry Valley.....	29 50@....
" " B—1, " "	27 50@....
" " No. 2, " "	26 00@....
No. 1, Massilon.....	28 00@....
B—1, "	26 00@....
No. 2, "	23 00@....
CAR WHEEL AND MALLEABLE IRON.	
No. 3 Lake Superior Charcoal.....	28 00@....
No. 4 " " "	29 50@....
Nos. 5 and 6 " "	29 50@....
BESSEMER IRON.	
Nos. 1 and 2 Lake Superior Charcoal.....	29 00@....
FORGE IRON.	
No. 1, Gray.....	23 50@....
White and Mottled.....	22 50@...

Indianapolis, Ind. Dec. 7, 1875.

Specially reported by NELSON KINGMAN, broker and dealer in pig iron, etc.

Prices remain the same.

Louisville. Dec. 14, 1875.

Specially reported by Messrs. GEORGE H. HULL & Co.

The market continues dull, sales being confined to iron for immediate use. Prices are unchanged. The usual time, four mos., is allowed on the quotations below:

HOT BLAST—CHARCOAL.	
No. 1 foundry, from Hanging Rock Ores.....	$25 00@26 00
No. 2 " " "	23 00@24 00
No. 1, Mill, from " "	—@—
No. 1. foundry, from Alabama, Georgia and Tennessee ores	23 00@24 00
No. 2, foundry, from Ala., Geor'a and Tenn. ores	22 00@23 00
No. 1, Mill, from " " " " "	21 00@22 00
HOT BLAST—STONE COAL AND COKE.	
No. 1, foundry, from Hanging Rock ores.....	23 00@24 00
No. 2, " " " " "	22 00@23 00
No. 1, Mill, " " " "	21 00@22 00

No. 1, foundry, from Ala. Ga. and Tenn. ores	23 00@24 00
No. 2, " " " " "	22 00@23 00
No. 1, Mill, " " " "	21 00@22 00
No. 1 foundry, from Missouri ores	24 00@25 00
No. 2 foundry, from Missouri ores	24 00@25 00
No. 1 Mill, from Missouri ores	25 00@26 00
COLD BLAST—CHARCOAL.	
Car Wheel from Hanging Rock ores	35 00@40 00
" " Tennessee "	28 00@30 00
" " Alabama and Georgia ores	28 00@38 00
" " Kentucky ores	28 00@40 00

Milwaukee. Dec. 14, 1875.

The following are the present prices, per ton of 2,240 lb. :—

Frankfort L. S. Charcoal, No. 1	$30 00
" " " No. 2 & 3	28 00
" " " No. 4 & 5	31 00
" " " No. 6	35 00
Mil. Anthracite L. S., No. 1	30 00
" " " No. 2	28 00
Wisconsin Iron, No. 1	26 00
Mahoning Valley Bit's No. 1	32 00
" " " No. 2	30 00

Pittsburgh. Dec. 15, 1875.

Specially reported by A. H. CHILDS, Esq.

The pig iron market is quiet, and transactions light. Now that manufacturers and puddlers have settled amicably the wages question for the Winter, it is probable that most of the mills will continue running, and it is hoped that prices will improve, or at least go no lower.

PIG IRON.—The general situation remains substantially as noted in our last report; it is certain trade is no better, nor is it to be expected, as it is always dull at the close of the year. About the only encouraging feature we have to notice is the satisfactory adjudication of the hitch between the manufacturers and puddlers, thus avoiding a much dreaded lock-out, and, thereby preventing an entire cessation of the demand for raw iron, which at best has been exceedingly small for a couple of months past. However, we do not look for any activity in the market for the raw article, as long as the product continues in its present unsatisfactory and depressed condition, and then is is not to be expected that the mills will stock up as long as there is a possibility of prices going lower, as is the case at the present time. It is true, some operators claim, that hard pan has been reached; that any further shrinkage, in view of the light production and steady reduction in stock is improbable; yet the same feeling prevailed during the summer and fall, and those who bought then because they thought the bottom had been reached have since discovered that they have made a mistake. The result is, operators having been deceived in the past have but little confidence in the future and the probability is that the hand to mouth policy will be closely adhered to until it has been clearly developed that a reaction has set in. It is true pig iron is down lower now than it has been for several years, yet we are assured that it is bringing more money relatively than the products, and it is apparent that there will have to be a further decline in the former or an advance in the latter, before there will be much business. Good mill iron may be quoted at $21@$21 50, cash, and $22@22 50, 4 mos., with little or no demand. Charcoal irons, both mill and foundry, continue very dull and with liberal receipts the supply accumulating, and a strong disposition to realize; prices are weak and drooping.

QUOTATIONS.

No 1. foundry	$25 00@26 00—4 mos
" 2. "	23 00@24 00—4 mos
Gray forge	22 00@22 50—4 mos
White and mottled	20 00@21 00—4 mos
Charcoal, No. 1 foundry	27 00@28 00—4 mos
Charcoal mill	22 00@23 00—4 mos
Cold blast car wheel, Eastern	30 00@35 00—4 mos
" " Western	40 00@50 00—4 mos

MANUFACTURED IRON.—The most and about the only important feature we have to record is the settlement effected between the manufacturers and puddlers in regard to the price to be paid for boiling, so that there is no longer any cause to apprehend a lock-out, which was very much dreaded in consequence of the distress that would undoubtedly have issued if the mills had been forced to suspend. As it is, however, trade is very dull; orders are coming forward sparingly, and prices continue unremunerative, and a pretty general suspension during the next few weeks is not improbable. It is customary with quite a number of our manufacturers to shut down in December to take stock and make repairs, and with a very limited demand and a general inclination to "pile up," the suspension this winter may be longer than usual. Prices continue irregular, so much so that it is difficult to give quotations. We hear of small sales on a basis of $2 20@2 25, 60 days, for merchant bars; also rumors that orders for larger lots can be and have been placed for considerably less

RAILS.—There has been considerable activity in steel rails recently, and the steel rail mills generally appear to be pretty well supplied with orders. The EDGAR THOMPSON Company continue to quote at $67, cash, delivered on board cars in Pittsburgh. The movement in iron rails continues light, from which it is very evident that they are being supplanted by steel.—*American Manufacturer.*

Richmond, Va. Dec. 14, 1875.

Reported by ASA SNYDER, Esq.

Receipts of charcoal irons continue very light; and sales are moderate, not more than 100 tons having been sold sice last report.

Quotations continue as at last report.

Virginia Cold Blast Charcoal Pig Iron	$27 to $33
" Warm " " " "	24 to 28
" " " Coke " " 1 X	24 to 25
" " " " " " 2 X	22 to 23
" " " " " " 3	21 to 22
" Anthracite 1 X	25 to 26
" " 2 X	23 to 24
" " 3	22 to 23

San Francisco.

From the *Commercial Herald*, Dec. 2, 1875.

There is an increased inquiry for tin plate, looking to a large increase in Salmon fisheries of this coast during 1876. Imports of pig iron continue excessive with very few sales making—not enough selling from first hands to establish reliable quotations. The trade appears to be well stocked with all kinds of manufactured iron, cast steel, lead, etc. In the absence of reported sales, quotations must be looked upon as more or less nominal. Oregonians complain because Oregon iron from the Oswego works is sold cheper here than in Portland. The fact is the surplus production has to be sent off and sold for what it will bring. The *Montana*, for New York via Panama, carried 3021 pigs lead; 272 bars base bullion.

St. Louis. Dec. 14, 1875.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

The iron market is still in a gloomy, unsatisfactory condition, and will be through the balance of the month.

Montreal. Dec. 6, 1875.

We quote pig iron :—Eglinton and Clyde, $21 50; Carnbroe, $22 50; American, $24 to $26; Summerlee and Calder, $23 00 to $23 50; Langloan & Gartsherrie, $23 00 to $23 50; Coltness $24 00 to 24 50; Hematite, $30 to $31. Bar, per 100 lb., Scotch and Staffordshire, $2 30 to $2 40; best do., $2 55 to $2 65, Swedes and Norway, $5 00 to $5 50; Lowmoor and Bowling, $6 50 to $7 00.—*Monetary Times.*

METALS.

NEW YORK, FRIDAY EVENING, Dec. 17, 1875.

Business in metals during the past week has been smaller than for months. But little business is anticipated at this time of the year, but that which exists is even smaller than was looked for.

Exports from New York for the 11 months ended November 30th—Among other items of the exports of domestic products and manufacturers appear the following: Brass and manufactures of, $80,905; copper ore, 1,765 cwt., $14,850; copper pigs, bars, sheets and old, 7,023,197 lb., $1 621,453; other manufactures of copper, $191,736; lead and manufactures of, $8,079; cartridges and fuses, $306,829; quicksilver, 61,105 lb., $53,712; ore or oxide of zinc, 5,225 cwt.. $31,753; zinc plates, sheets pigs and bars, $312; and tin and manufactures of, $22,801.

Gold Coin.—During the week past gold has ranged from 114⅛@114⅛, and closed at 114⅛.

Bullion.—Fine silver bar is quoted at $1 23⅛@1 24, gold, per ounce, and fine gold bar at par ($20 67, gold, per ounce,) to ¼ per cent. premium.

Copper.—The sales during the week have not aggregated more than 300,000 lb. at 23⅜c @23½c. which are the asking prices to-day, for both Lake and Baltimore. The stock of copper in the market is estimated at 12,000,000 to 15,000,000. It is rather a difficult matter to ascertain what the exact stock is. The latter figure is 50 per cent. greater than the stock estimated to have been here January 1st. On the 15th inst. Chili Bars were quoted at £81 10/ in London, and Best Selected £89 on the 11th inst.

The charters of Chili Bars for the last half of November were 2,600 tons pure. The following statistics show the position of copper in Europe as it stood Dec. 1 :

	1st Nov.	1st Dec.		
	1875. Tons.	1875. Tons.	1874. Tons.	1873 Tons.
Actual Stocks	23,614	20,839	20,685	29,699
Chili, chartered and afloat	8,986	8,337	7,056	6,285
	32,600	29,176	27,741	36 084
Price of Chili Bars (GOBs	£82	£80⅛	£87	£83

The deliveries during November were 6,675 tons, as against 6,827 tons during November 1874, and 5,575 tons during November 1873.

Ernest W. S. Murrant, of London, under date of Dec. 2, says: "In Chili transactions now seldom occur, and when carried out, are chiefly kept secret. The stocks continue to show very favorably, and this year's deliveries have suddenly overtaken the imports; but this sort of thing has ceased to excite more than a passing remark. Prices show a decline of about 30/ per tons for the month, the reported sales having been 1,300 tons g. o. bs. and named brands, at £83 10/ to £80 10/ for cash and prompt. A further reduction in values now appears imminent."

Tin.—The market for pig tin has been very quiet. We are quoted prices as follows: Straits, 19¼c.@19½c., gold, per lb.; L. & F., 19c.@19⅛c.; Refined, 19¼c.@19½c.; and Banca, 23½c. Advices by cable to-day, quote Straits, in London at £82 10/. Advices from Singapore on Wednesday. quoted Straits tin at $23 per picul. At the present moment there is no information indicating that the troubles at Perak, are likely to seriously disturb the production of tin.

Tin Plates.—There has been but little business doing during the past week. We quote charcoal tins, per box, at $7 50, gold, and ternes, $7@$7 25; coke tins, $6 62½@$6 75 and ternes, $6 25@$6 50. Makers in England are firmer in their prices.

The following statistics show the position of Tin in Europe as it stood on the 1st inst. :

	Nov. 1,	1st Dec.		
	1875. Tons.	1875. Tons.	1874. Tons.	1873. Tons.
Actual Stocks	7130	7890	4608	3554
Afloat for Europe	2832	2815	2985	2036
	9962	10,705	7593	5590
Price of Straits	£85⅛	£81⅛	£93	£115
Banca Tin in hands of the Dutch Trading Company :				
Unsold in Warehouse	2276	1920	3709	3464
Afloat for Holland	463	300	245	485
	2739	2220	3952	3949

Mr. MURRANT says of Tin :—At the sale of Banca in Holland on the 30th November, about 719 tons went off at an average of 50 60fl., equal to about £86/10 laid down here. Foreign sorts in London have been depressed, and a drop of about £4 is shown since the beginning of the month. A further heavy drop is spoken of as probable by those interested. The spot London and Holland Stocks are exactly what they were a month since. The market closes very quiet at the recent reduction with but few sellers. The reported transactions of the month were 1 300 tons Straits and Australian at 86/ to 81/ for cash and arrival. Vhere was a little excitement at the last moment, but sellers appeared to have the best of it."

Lead.—We are reported a sale of 1,000 tons of Soft Missouri, to a dealer in this city, but are unable to confirm the report. There have been sales of about 100 tons of ordinary lead at 5.90c.@5.95c. gold. The demand is very light and no improvement is looked for several weeks.

Spelter and Zinc.—Domestic spelter is very quiet at 7.40c., currency, 30 days. There is nothing new to report in Foreign, which is still quoted at 7.15c.@7.40c., gold. Sheet zinc is quiet at 8¾@9c., gold.

Antimony is very quiet but firm at 14¼@14½c., gold.

Quicksilver.—This market is quoted at 80c. per lb. and San Francisco at 75c. Our mail advices, bearing date of London, December 3d, quote that market at £13.

The San Francisco *Commercial Herald*, of Dec. 2, says : "The bad condition of the roads tends to lessen supplies very materially, there not being sufficiency enough for orders in hand for the China steamer. Prices in consequence have been advanced during the week, with sales of several hundred flasks in lots at 65@67½c., some holders exacting 70. London quotations by cable, £12. At the close London quotations are received of an advance to £13—with sales here for New York account at 80c.".

FINANCIAL.

New York Stocks,

FRIDAY, Dec. 17, 1875.

The shares of the New Jersey Central R. R. Co. show a slight advance on our last quotations, with this exception, the general tendency of the list is downward, the transactions for the week exhibit a decrease of some 3,000 shares compared with the previous week.

The stock of the Quicksilver Mining Co. is firm and active, over 3,000 shares of the common and prefered having changed hands during the week, at slightly advanced figures The consumption of quicksilver is rapidly increasing, and it is estimated that the demand of the California mine alone will amount to 15,000 lb. before the end of the year. The exports amounting to 13,000 flasks in 1870 and 15,000 flasks in 1871, have gradually declined to 6,700 flasks exported in 1874, and this in the face of a continued increase of production.

The stock of the St. Louis and Iron Mountain R. R. Co exhibits a fractional advance. The earnings of this company for the present year ending with the third week in November, amounts to $3,221,644 being an increase of about $400,000 over the earnings for the same period in 1874.

Mariposa Land and Mining Co.'s stock has declined, an assessment of $1 per share has been levied on the prepared and common stock of this company, payable Dec. 31st.

Bonds are fairly active and unchanged, with the exception of the various issues of the New Jersey Central R. R. Co., which have advanced with sales amounting to $42,000 for the week.

Sixty-seven shares of the George's Creek Coal Co.'s stock have been sold in the Baltimore Stock Market, at from $147 to $148 per share. Also 200 shares of the Atlantic Coal Co's stock at $260.

The stock of the American Gas Coal Co. is quoted in the same market at 20.

A meeting of the stockholders of the Pittsburgh and Connelsville Railroad was held at Pittsburgh on the 13th inst., to consider the proposed consolidated mortgage, and lease of the road to the Baltimore and Ohio Railroad Company. After a discussion of several hours, the lease was adopted by a vote of 28,574 shares for, to five shares against. We note sales of the 1st mortgage 7 per cent. bonds of the Pittsburgh and Connelsville RR. in the Baltimore stock market during the week ending the 14th inst., amounting to $4000, from 106 to 106¼.

The *Iron Home*, of Ishpenning, Mich., under date of Dec. 11, states :

"The Northern Iron Company has just gone into bankruptcy. That is what it is called now. It has taken about five years to find out the proper name for its actual condition."

The annual meeting of the stockholders of the Central Petroleum Company for the election of Trustees, to serve for the ensuing year, and for the transactions of such other business as may come before them, will be held at

the office of the company, on Monday, January 3. 1876, at noon.

The earnings of the Union Pacific R. R. Co. for the first ten months of the present year equals $9,919,033, which is an increase of $1,256,911 above the earnings for the same period last year. The executive committee of this company, it is reported, recently reported to the board of directors that a dividend of not less than two nor more than three per cent be declared for the quarter ending January 1. The impression prevails that the dividend will be two and a half per cent. The company has just paid its December interest, amounting to $700,000, and since November 1, $959,000 have been sent to New York, and more is to be sent soon.

The attempt to obtain a government guarrantee for the payment of interest on bonds of the Texas and Pacific Railroad has received a check in Congress.

Mr. C. P. HUNTINGTON, the president of the Union Pacific R. R., in a letter addressed to the *Railroad Gazette* of this city, expresses his willingness to build the T. & P. R. R. for the land grant alone, which amounts to 16,000,000 acres without any government guarantee of interest on the bonds.

Quotations and Sales of Stocks and Bonds,

For the week ending Dec. 17, 1875.

STOCKS.

	Highest	Lowest	Closing	Shares sold.
Pennsylvania Coal Co	—	—	277½	—
Consolidation Coal Co	—	—	47	—
Spring Mt. Coal Co	—	—	60	100
American Coal Co	—	—	48	—
Maryland Coal Co	—	—	18	200
Del., Lack., and West. RR. Co	120	119½	119⅞	2295
New Jersey Central RR. Co	105⅝	104	105⅝	1304
Delaware and Hudson Canal Co	123	122½	122¾	287
Quicksilver Mining Co. pref'd	24⅜	23⅜	23⅝	1000
" " " Common	18¾	17⅝	18	2100
Mariposa Land & Min. Co. various.	9	7½	7½	1200
St. Louis & Iron Mountain RR	16½	16⅛	16½	1390
Lehigh & Wilkes-Barre Coal Co	—	—	40	—
Total Shares sold				9876
Sales for the week previous				12909
Decrease				3033

BONDS.

	Sales.		Price	
Ches. & O. R. R. 6s, 1st. cou. on	5,000		29	@ 32
" " " ex coupon	—		—	@126
Central RR. of N. J. 1st Mtg. N.	7,000		115¼	@115½
" " " 1st Cons	11,000		107¾	@109¼
" " " Convt.	24,000		104⅛	@105¼
Del. and H. Canal, 1st Mtg. '77	—		—	@103
" " 7s, '94	4,000		—	@108
" " Reg. '91	3,000		113	@113¾
Del., Lack. & W. R. R., 7s, conv	—		—	@124
" " " " 2d Mtg.	4,000		—	@114
St. Louis & Iron Mount'n 1st Mtg	7,000		93⅛	@ 93¼
St. Louis & Iron M'tn, 2d Mtg.	4,000		—	@ 51†
Lehigh & Wilkes-Barre Cons	11,000		95¾	@ 96
Total Sales	$80,000			

Closing quotations, in the absence of sales, represent the latest prices bid.

† Asked.

Philadelphia Stocks.

PHILADELPHIA, Dec. 17, 1875.

The Philadelphia Stock Market has been fairly active during the past week, at generally lower prices. The Pennsylvania RR. shares are unchanged; this stock is firm, however, with dealings amounting to nearly 30,000 shares for the week. The Lehigh Coal & Navigation Co.'s stock is down ¾ per cent., with sales of nearly 7000 shares for the week.

Bonds are dull and inactive.

$2,000 L. V. RR. cou. mtge. 6s were sold at auction during the week at 97; also $10,000 Colebrookdale RR. Co.'s 1st mtge. cou. 6s, principal and interest, guaranteed by the Pa. RR. Co. at 81½.

The United New-Jersey Railroad & Canal Co. have declared a quarterly dividend of $2 50 per share, payable both in Philadelphia and New York on the 10th of January.

The *Commercial List and Price Current*, of Philadelphia, states that "The Logan Coal Co., having an office at No. 228½ Walnut street, is in financial trouble. The nominal value of its assets (most of which are in Clearfield County, Pa.) is $54 582.75; estimated value, $47,393.31; liabilities, $27,658·28.

Quotations and Sales of Stocks and Bonds.

For the week ending Dec. 17, 1875.

STOCKS.

	Highest	Lowest	Closing	Shr's
Lehigh Valley RR. Co	62½	62	62⅜	626
Pennsylvania RR.	51¾	51	51¼	29900
Reading RR.	55⅜	55	55¼	4478
Lehigh Coal and Nav. Co	50⅛	49½	49½	6471
Penn. Canal	—	—	9	—
Buck Mountain Coal Co.	—	—	—	—
Fulton Coal Co.	—	—	3½	—
Locust Mountain Coal Co	—	—	—	—
Westmoreland Coal Co.	—	—	80.	—
St. Nicholas Coal Co.	—	—	1	—
Cambria Iron Co	—	—	16	20
Crane Iron Co	—	—	46	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co	76	75¼	75¼	90
Total shares sold				41,585
Sales for the week previous				30,891
Increase				10,694

BONDS.

	Sales.		Price	
H. and B. T. RR. 1st mortgage, 7s	—		—	@106
" " " 2d " "	—		—	@102½
" " " 3d " cons	6,000		56¼	@ 56½
Lehigh Valley RR. Con. mtg. 6s, Reg	7,000		—	@ 97¼
" " 7s, 1910	1,000		—	@111
" " 6s reg.	2,000		103¼	@103½
Pennsylvania RR., 1st mtge. 6s	3,000		—	@105¾
" " gen. " cou. 1910	8,000		—	@102¾
" " gen. " 6s, reg	2,000		—	@102¼
Phil. & Reading RR. 7s '93	—		—	@108
" " " G. M. 7s, cou. 1911,	—		—	@105½
" " " " 7s, Reg	—		—	@106
" " new convertible 7s	16,000		—	@109
Phil. & Reading C. & I. Co. 7s deb.	—		—	@ 83
" " " 6s Tam. Tract	—		—	@ 90
" " " Glenthworth Tract	—		—	@ 90
Lehigh Coal & Nav. Co., 6s '84	250		—	@103
" " " RR., '97	—		—	@102½
" " " Con. m. 7s	—		—	@102
" " " gold, '97	—		—	@107
Penn. Canal, 6s	5,000		—	@ 72
Penn. and N. Y. Canal, 7s	1,000		—	@107
Ches. and Del. Canal, 6s	—		—	@ 88
Susquehanna Coal Co. 7s	—		—	@ 70
Buck. Mount Coal Co. 6s	—		—	@ 97½
Penn. Gas Coal Co. 6s	—		—	@100¼
Total amount of sales	$51,250			

Closing quotations, in the absence of sales, represent the latest prices bid.

Gold and Silver Stocks.

NEW YORK, Dec. 17, 1875.

The mining share market continues very irregular, with a tendency to higher prices. We note a decline of $10 per share in Justice and an advance of $10 per share in Yellow Jacket. Eureka, Grass Valley, has declined to $3 per share from our last quotations of $6, a week ago. The shares of the Consolidated Virginia Mining Company have advanced to $373. This brings the present market value of this mine up to $40,284,000. A dividend of $10 per share has been declared by this company, payable on the 11th inst. This dividend was principally from the surplus earnings of the Company accumulated before the fire.

It is rumored that the annual election of the Kentuck Mining Company, held on November 24, was controlled by Senator JONES, and the management has passed into the hands of a board of Trustees selected by him and his friends. The capital of the company is $3,000,000; the assessments levied amount to $270,000, and the dividends paid to $1,252,000.

The Bank of California has levied an assessment of $10 per share on its entire capital stock, delinquent January 10, 1876.

The mills of the Crown Point Mining Company are crushing of their own product 425 tons per day.

MINING NOTES.

The bullion shipments from Pioche, Nevada, to London amounted, during November, to $108,128. As the mills of the Pioche district are now all running to their full capacity, it is expected that the December export of bullion will show a heavy increase.

The Empire Mining Company is turning out about $1000 gold bullion per day.

The ore in the lowest level of the Knoxville Mine carries about $75 per ton in gold, and the mine is paying an average profit of $100,000 per month.

The product of the Northern Belle Mine for the week, ending November 28, was 393 tons, of which 381 tons were shipped to the mills.

In the last run of ore at the DAHLER & ARMSTRONG furnace at Glendale, Montana, the average yield on 70 tons was $440 per ton.

The K. K. Silver Mine, Eureka district, Nevada, has struck, on the 700-foot level, a ledge of good ore thirty feet wide.

Up to the week ending December 1st, 1875, 11,612 feet had been driven in the Sutro Tunnel. Several stringers of coal of about two inches in thickness were struck 11 552 feet from the mouth of the tunnel, extending to 11,612 feet, the present face. This coal has been tried at the Company's blacksmith shop, and pronounced good for blacksmithing purposes. It is hard, bright, and very much resembles that found in the Black Diamond mine, in Palmyra District.

The suit brought by Mr. GEORGE W. KINNEY, of San Francisco, against the Consolidated Virginia Mining Company and SOLOMON HAYDENFELT, to recover six feet of the Consolidated Virginia Mine, of the value of $1,000,000, has been transferred to the United States Circuit Court.

The dividends paid by San Francisco mining companies, for the month of November amounted to $1,433,830, an increase of nearly $200,000 over the same period in 1874.

The U. S. Mint has recently been supplied from New York with fine bars sufficient for the coinage of $1,000,000, per month, of subsidiary coins. The Treasury Department has sent at various times a large amount of small silver coins to the Assistant United States Treasurer at Boston, to be held on deposit there until such time as the Secretary is ready to begin the redemption of fractional currency. It is stated that over $5,000,000 of this class of coin is so held in Boston.

The coinage operations of the mint of California for the month of November aggregate $2,623,000. The production of the several denominations were: double eagles, $1 820,000; trade dollars, $517,000; half dollars, $36,000; dimes, $250,000; of the total value of $2,623,000. The trade dollars go to China and the dimes to Washington. The double eagles are retained at San Francisco for circulation.

QUOTATIONS:

	No. of shares.	Dec. 8.	Dec. 16.
Sierra Nevada	100,000	$17	20
Union Consolidated	100,000	8	9
Mexican	108,000	20	18
Ophir	108,000	51	47
California	540,000	67	67
Consolidated Virginia	108,000	362	373
Best & Belcher	100,800	54	58
Gould & Curry	108,000	19	18
Savage	112,000	16†	18
Hale and Norcross	16,000	36	44
Chollar Potosi	28,000	82	85
Alpha Consolidated	30,000	18	18
Imperial	100,000	8	8
Yellow Jacket	24,000	86	96
Kentuck	30,020	14	14
Crown Point	100,000	31	29
Belcher	104,000	33	33
Overman	38,400	54	57
Caledonia	20,000	23	21
Justice	165,000	34	24
Raymond & Ely	30,000	22	18
Meadow Valley	60,000	3	3
Eureka Consolidated	50,000	17	15
Eureka C. V.	20,000	6	3

† Increase of 7 shares for one.

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & CO., Bankers and Brokers, room 7 Traveller Building, 31 State street, Boston.

THURSDAY EVENING, Dec. 16, 1875.

There is very little change to note in the copper market for the week. Calumet and Hecla continues heavy at 160 Copper Falls has declined to 6.00 per share, asked. Duncan Silver is very quiet at about 1.30, and will probably remain so until they have some further advices from the mine. There is a rumor of an assessment on the Petherick at .25 per share.

We hear of nothing new from the Quincy; their yield for November was 205 tons. The stock is a trifle weaker at 43¾. Eastern RR. has again been one of the features of the market, fluctuating this week between 8½ and 12¾, and closing at 11½@11¾ on a heavy business. Allouez is considerably stronger at 17½ bid, and its friends talk of very high figures. They seem to have a strong combination.

The copper product of the Calumet and Hecla Mining Company for the month of November amounted to nearly 1191 tons.

Articles of association of the Marquette Silver Land Company, and the Ontonagon Southern Silver Company were filled with the Secretary of the State, at Lansing, Mich., on the 1st of November.

DESCRIPTION.	Par Value.	No. of Shares.	CLOSING. Bid.	Asked.
Allouez	$50	20,000	$ 16½	$17
Calumet and Hecla	50	80,000	159½	160
Central	25	20,000	34 25	34 75
Copper Falls	25	20,000	5½	6
Dana	25	20,000	15	17
Duncan Silver	20	60,000	1 25	1 30
Franklin	25	20,000	13¾	14¼
Humboldt	25	20,000	25	30
Madisca	25	20,000	25	30
Mesnard	25	20,000	70	75
Minnesota	25	20,000	2 00	2½
National	15	20,000	2¼	2½
Petherick	25	20,000	40	55
Pewabic	25	20,000	4¾	5
Phenix	25	20,000		
Quincy	25	20,000	43 50	43 75
Ridge	25	20,000	5¾	6¼
Rockland	25	20,000	20	30
Silver Islet	—	—	—	—
Star	25	20,000	25	30
Superior	25	20,000	15	20
Eastern RR.			11½	11¾

Gas Stocks.

NEW YORK, Dec. 17, 1875.

The feature of the week in the gas stock market is the continued decline in the stock of the Brooklyn Companies. A comparison of the quotations to-day, with those ruling a month ago, exhibits a decline of from 5 to 15 per cent., which is certainly of sufficient importance to attract the attention of the managers of these companies, to the necessity of improving their gas and lowering its price. It is stated that the quality of gas at present supplied by some of the Brooklyn Companies is so poor, that even with an increase of from 50 to 70 per cent. in the consumption, a very unsatisfactory light is obtained, the result of this is the surrender of a large number of metres during the last three months.

We note the sale of 100 shares of the Manhattan Gas Co.'s stock, at auction at 309 to 309½, also 57 shares of the Northern Liberties Gas Company, of Philadelphia, at 38½.

The People's Gas Company, of Baltimore, has declared a dividend of 3 per cent., payable January 3d. Sales of this stock in the Baltimore market amounted last week to 230 shares at 27½ per share, also 3,000 of the gold certificates of the Baltimore Gas Company were sold at 107, sales of 10 shares of the Salem, Mass., Gas Company are reported to us at 115½, also 4 shares of the Lynn Gas Company at 106.

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H. PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad st., N. Y.

Quotations "bid" and "asked" of New York City and Vicinity Gas Companies are on the $100 of stock and not on one share.

Companies in New York and Vicinity	Cap. Stk.	Par.	last Dividend.	When Paid.	Bid.	Askd.
			pr.c			
Mutual, N. Y.	$5,000,000	$ 100	2½	Oct. '75	110	111
" " Bonds	900,00	1,000	3½	Aug. "	105	107½
New York, "	4,000,000		5	Nov. "	149	150
Metropol. "	2,500,000	100	5	Sept. "	155	157½
" " Certf.	1,000,000	...	3½	" "	104	105
" " Bonds	500,000	1,000	3½	July, "	105	
Harlem "	1.850,000	50	4	Aug. "	135	137
Manhattan "	4,000,000	50	5	July, "	309	311
Brooklyn, B'klyn	2,000,000	25	5	Nov. "	240	245
Nassau "	1,000,000	20	4	July, "	130	132½
" " Certf.	700,000	1,000	3½	Nov. "	100	100½
People's "	1,600,000	10	3½	July, "	98½	100
" " Certf.	300,000	1,000	3½	July, "	95	97½
" " Bds	325,000	....	3½	Aug. "	100	101
Metropol. "	1,000,000	10	3½	May, "	98	101
Wmsburgh "	1,000,000	50	5	July, "	145	155
" " Certf.	1,000,000	....	3½	July, "	100	101
Citizen's "	1,200,000	20	2½	Oct. "	139	142
" " Certf.	320,000	1,000	3½	Oct. "	100	101
J. C. & Hob'n. N.J.	386,000	20	5	July, "	160	170
Centl. Westch. N.Y.	466,000	50	4	July, †	100	105

† Gold.

Companies out of Town.*	Cap. Stk.	Par	Bid	Askd.
People's " " of J. C....			130	
Citizen's G. L. Co., Newark, N.J.	500,000		50	65
Hempstead" " L. I., N.Y.	40,000	100		100
Jamaica, " " "	25,000	100		100
Richmond Co., S. I. "	300,000		100	105
Citizens', Rochester, "		100	60	68
Rochester Gas Co., "		100	50	
Peploe's G. L. Co. Albany,"	1,000,000	100		60
Mutual " Buffalo "	750,000	100	55	60
TroyG . L. Co., Troy, N. Y.....			108	
Brockport, N. Y., G. L. Co.	25,000	100		85
Baltimore G. L. Co., Balt., Md.	2,000,000	100		195
People's G. L. Co., Balt., Md	2,000,000	25	27¼	
Hannibal G. L. Co., Hanni., Mo.	100,000	100		60
La Clede, Mo				123
Lewiston G. L. Co., Lewis., Me	400,000	100		75
Chicago G. L. Co., Chicago, Ill.	2,000,000	100	140	
Jacksonville, Ill.....	120,000	100	82	85
Lima, Ohio.....	60,000	100	10	
Derby G. L. Co., Derby, Conn..	160,000	100		80
Woonskt G. L. Co.Woonskt,R.I.	150,000	100	100	
Fort Wayne G. L. Co. F. W.,Ind		100		105
North. LibertiesG. L. Co. Phila.		25	38¼	
Wilkes-Barre G. L. Co W. B. Pa.		50	70	
Washington G. L. Co., Phila....			42	43
Pottsville, Pa.. Gas Co....		50	40½	
Portland G. L. Co. Portland, Me	350,000	50	72	75
Hartford G. L. Co., Hartford,Ct	700,000	25	45	
Boston G. L. Co., Boston, Mass.	2,500,000	500	770	775
Chelsea G. L. Co. Chelsea, "	300,000		139	
Cambridge G. L. Co., Cam., "	700,000		132¾	
Louisville G. L. Co., Louis., Ky.			127	
Cincinnati G. L. Co , Cincin, O..				200
S. F. G.L. Co. San Francisco,Cal	10,000,000	100	90	95
City G. L. Co. Montreal, Canada	1,440,000	40	132	135
Consumers G. L. (old,)Tor.,Ont	600,000	50	131	
Hamilton G. L. Co., Ont.....	150,000	40	112½	
Halifax G. L. Co., Halifax, N.S..	400,000	40	148	150

* These quotations represent the latest obtainable prices at which sales were made.

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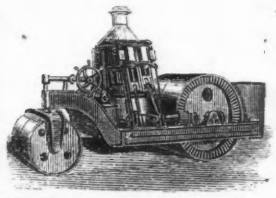

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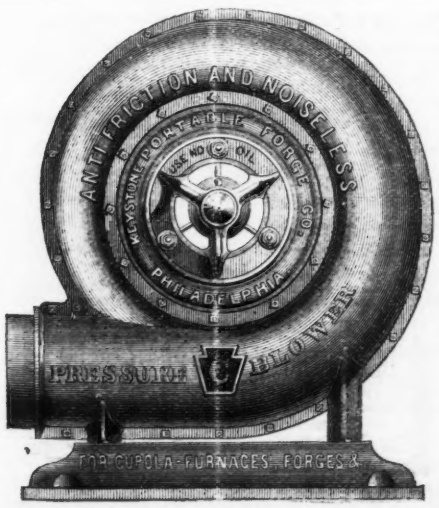

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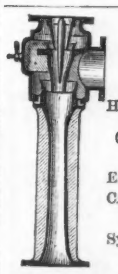

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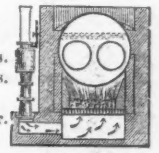

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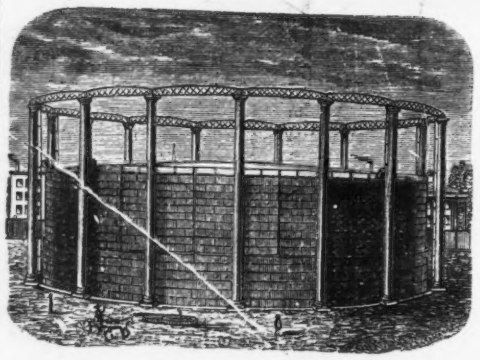

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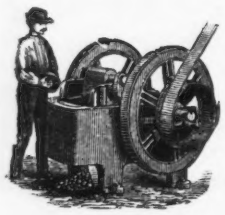

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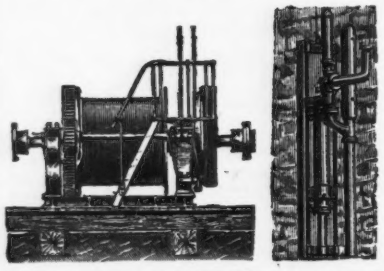

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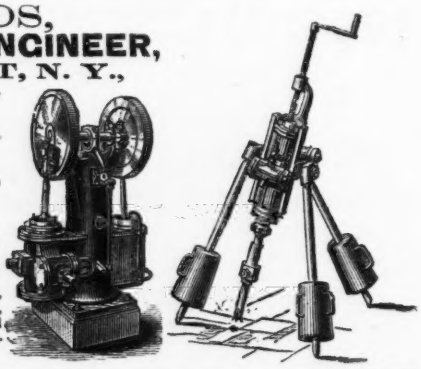

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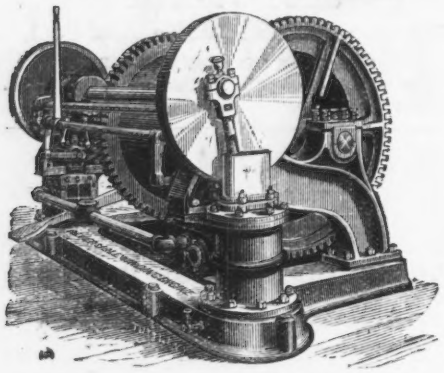

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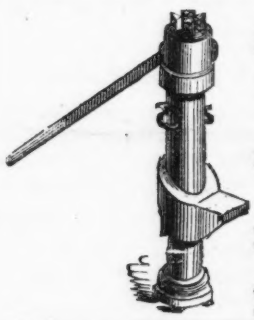

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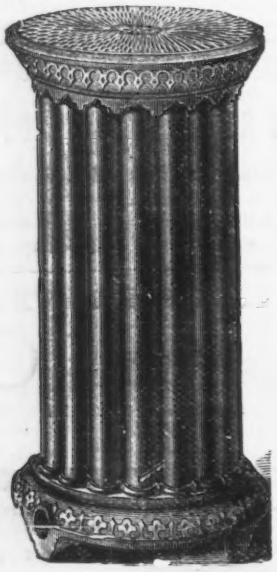

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